ORT WAVE MAGAZINE

short wave magazine

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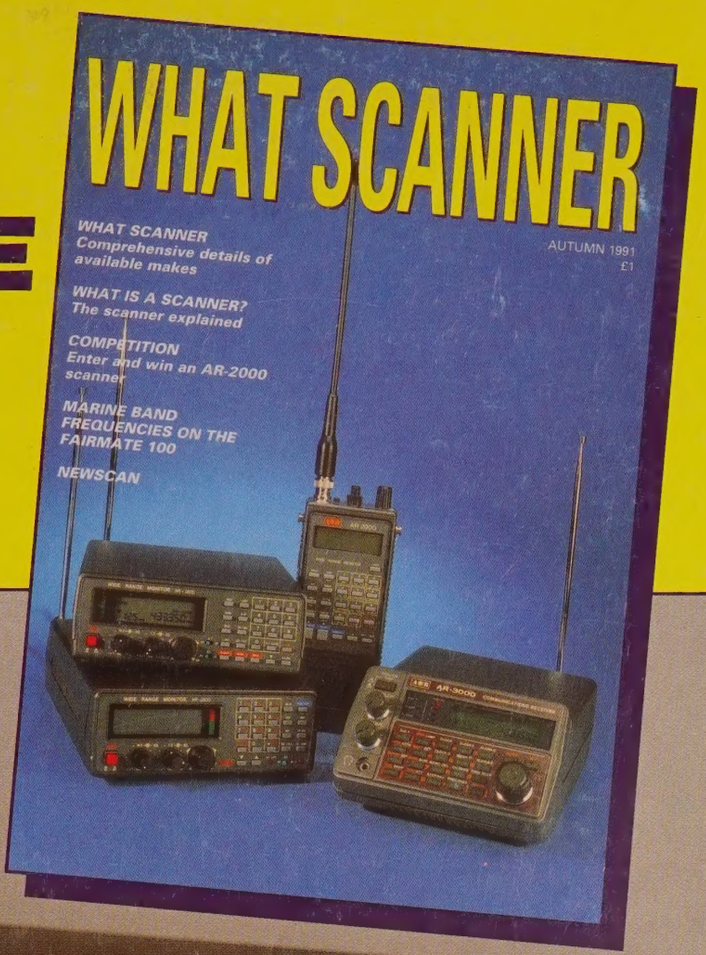
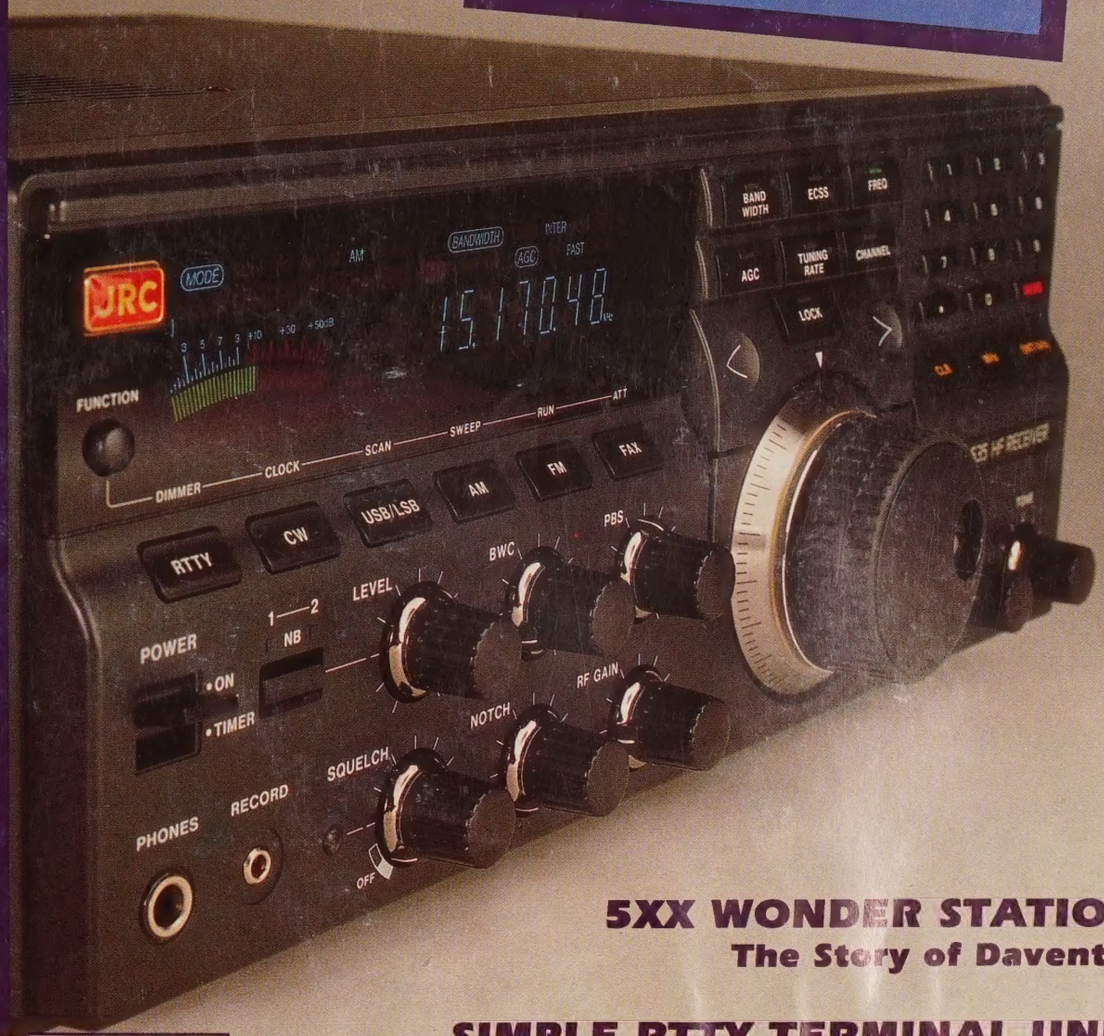
FREE INSIDE

16-page WHAT SCANNER MAGAZINE



REVIEWED THIS MONTH

NRD-535 Communications Receiver



5XX WONDER STATION

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short wave magazine

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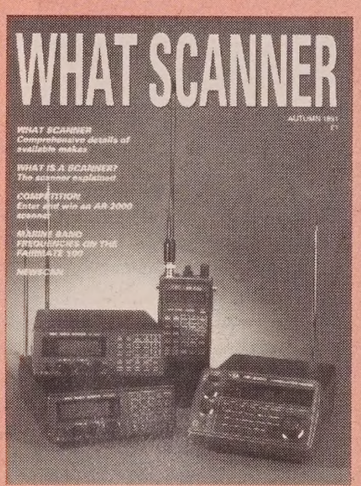

16-page pull-out What Scanner magazine

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Cover: A new receiver from JRC is always of interest and this month Mike Richards has reviewed their latest offering - the NRD-535. Also inside is *What Scanner*, our annual look at this popular segment of the listening market.

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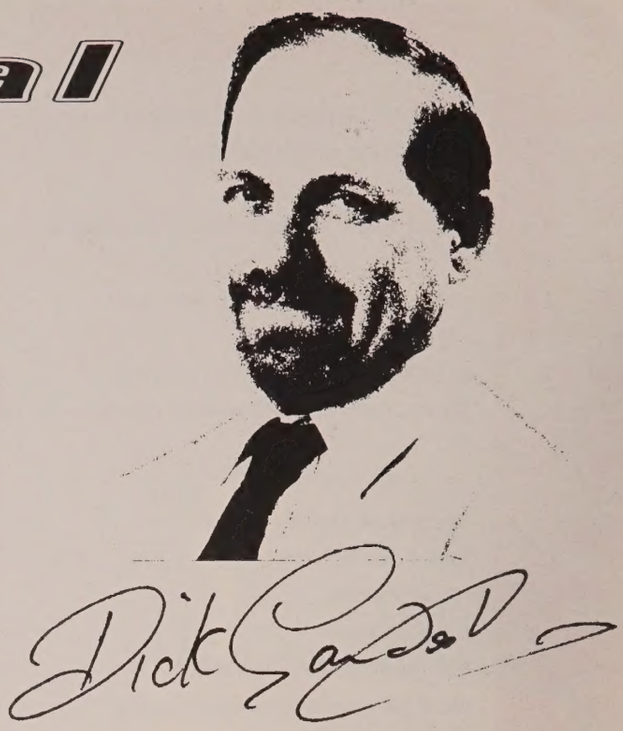
...GOOD LISTENING

editorial



SWM SERVICES

Subscriptions

Subscriptions are available at £21 per annum to UK addresses £23 in Europe and £25 overseas. Subscription copies are despatched by Accelerated Surface Post outside Europe. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £34 (UK) £37 (Europe) and £39 (rest of world).

Components for SWM Projects

In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit boards for *SWM* projects are available from the *SWM* PCB Service.

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past five years are available at £1.80 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style *SWM*, are available price £5.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for p.c.b.s, back numbers, binders and items from our Book Service should be sent to **PW Publishing Ltd., FREEPOST, Post Sales Department, Enefco House, The Quay, Poole, Dorset BH15 1PP**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Poole (0202) 665524. An answering machine will accept your order out of office hours.

The October issue of *Short Wave Magazine* was the largest ever produced. Including the free, pull-out *International Radio* magazine and the covers it totalled a massive 100 pages.

This month we have another bumper 100-page issue for you. Last November we produced the first *What Scanner* magazine and this month we have put together another issue for you. You will find it stapled into the centre of the issue.

In the coming months I have even better and brighter things planned for you. I intend to keep *SWM* the biggest and best radio enthusiasts magazine on the newsagents' shelves.

Radioline is *SWM*'s own weekly telephone information line giving you the latest news of radio happenings and rallies.

Since it started 100 weeks ago it has developed into a useful source of information.

Unfortunately Simon Spanswick's regular propagation report has had to be suspended temporarily, but a report for the DXTV enthusiast, provided by Tim Anderson, is now a regular feature.

Full details on page 18.

letters

Dear Sir

Sitting at breakfast with my newly arrived copy of *SWM*, I turned to page 12. My Weetabix went soggy with fright and my tea turned cold on the spot! I re-read the feature on the future of short wave radio and still could not believe what I was reading.

As a young boy, I well recall the thrill of reading off those strange names from the dial and the three minute wait while the set warmed up. I sat for hours listening to the faint monotonous tones of what I now know was Shannon Volmet, wondering at the hissing and crackling sounds that came from out of the skies. Now I am told that all this may be a thing of the past.

I re-discovered short wave listening a couple of years ago and found that the thrill of tuning to a radio station from the other side of the world had not diminished over the years. Being that much older, I find it a challenge to try and get the best from my radio and antenna. I fiddle and alter, add bits and take bits away, much the same as a car enthusiast does with his engine. If I had won the pools I doubt if I would have been more excited that the first time I winkled Alice Springs and Tennant Creek out of the æther.

The world of Ian McFarland struck terror in my heart! No more fading? No more co-channel interference? This is the very essence of s.w.l. coming under attack! What fun will there be in picking up digitalised super signals from a lump of solid state gubbins floating around in space? Will every radio signal now become 'DX' simply because it comes from thousands of miles above the earth?

Perhaps I am getting old, anachronistic and behind the times. Am I wrong in seeing s.w.l. as a challenge? I don't think so. I have a hobby that is absorbing, exciting and challenging. It is safe (barring lightning strikes), enjoyable, cheap and (as I keep telling the wife) keeps me out of the pub!

So come on s.w.l.s - let's start a 'Down with DBS' Group. Long live fading and co-channel interference!

Ron Galliers
Islington

Why is the Short Wave Magazine,
Now at its very best?
As each month we proudly -
Read it, thus invest.

It suits the short wave listener -
Around this monitoring nation.
Not too technical; - informative!
An excellent creation.

We!! The silent ones - no ticket to talk,
So we have 'little' voice -
We're not all born talkative -
So listening is our choice.

So with a good antenna -
And a good report as well -
You'll always end up satisfied -
With a welcomed QSL.

Anon 4-9-91

letters

Dear Sir
The letter from B J Priest, Cleveden referring to the RAF h.f. receiver R1084 used at base stations in WWII revived many memories.

In 1939 I was called up from the RAFVR to serve in the RAF as a Wireless Op/Mechanic and became acquainted with the R1084 within a few months of entry, on a 'Battle of Britain' fighter station. If my memory serves me right it had 13 valves, accessible via the heavy lift-up lid of the metal cabinet.

The answer to his question as to how we managed when the T1085/1190 transmitters drifted off frequency can best be summed up by saying 'with difficulty and patience, plus a couple of good ears'. On some shifts of duty I used to take c.w. messages from the Air Ministry. Other duties involved RT operating to the fighter aircraft (Spitfires/Hurricanes) and servicing the TRXs (Type TR9). In this connection I recall the introduction of a modification to prevent the pilot leaving his set on in the 'transmit' mode. It meant fixing a length of strong elasticated cord to the 'send/receive' lever so that it had to be held against tension when transmitting!

Later, moving into Bomber Command involved servicing RX1082 and TX1083 and later the R1154 and T1155 - of which good examples can be seen today at the Hall of Aviation in Southampton. Other receivers I used during my service on operational circuits were the Marconi CR100 and the American (RCA) AR88 and (National) HRO. Like the R1084 they were built to last and did a wonderful service both prior to, and after the war.

Although much later on I moved into higher echelons via Cranwell, I reckoned that those early days in the ranks were the most interesting and rewarding on many counts.

My amateur radio station (G3VD) was closed down by the authorities within days of the declaration of war and it was only in February this year that I had my old licence renewed. I am now looking forward to being active again on the h.f. amateur bands.

B.A. Pettit
Southampton

Dear Sir
I'll try and keep this as short as possible

Beware of the repair. I own a Trio R5000 receiver which went faulty early last year, brief description of symptoms....display going in line of dots and no signal strength reading on S-meter (it received Radio 4, etc!). Sometimes it would suddenly burst into life when it had been switched on an hour (not much use for instant logging). So last July, fed up with all this, I and the wife took it back to the dealer and explained the situation whereupon they kept it and after a month I got it back with a bill, but it was no better. So a fortnight later it went back again and again it came back no better. By this time I had been told there was nothing wrong with the receiver, yet my wife and friends had seen quite well what was happening. So off it went again and was away so long I threatened to have it back and send it back to Kenwood in Japan. So the dealer said they would contact them and in the meantime loan me another receiver as they could not find anything wrong with mine. But the receiver I was loaned was like comparing a moped with a Rolls! Anyway, by now it was Xmas and I decided one way or another I was going to have the 5000 back - repaired or not. So by the middle of January I had got it back - and you've guessed - the problem was still there, but I had to tell the dealer it was OK because they obviously were not going to repair it. So I sent back the loaned receiver and left it at that even though I was unhappy with the situation. So in six months I'd had the the receiver for just six weeks, got all sorts of paperwork saying what had been done to it and also travelled 300 miles in trips to and from the dealer to no avail.

By June this year the receiver was taking up to two hours or longer to come on - sometimes it would burst into life if it was thumped because by now I wasn't bothered as it was bin material and no use for the job it's got to do.

One Friday, at the start of July, one year on, the wife and I took our lives into our hands and removed the top to be confronted by something we knew nothing about. With the receiver on and a plastic knitting needle we touched all connectors in sight and pulled all the visible wires. Lo and behold we could make the receiver go on and off, signal strength wise, at will. Then, five minutes later, we suddenly realised what it was. On the front of the circuit board at the back of the display there are two miniature phono plugs and these were causing all the problems by not making circuit properly, So I pulled them out, sprayed them with Servisol and the receiver has worked like a dream ever since.

Ken Lancaster
Barnsley

IF YOU HAVE ANY POINTS OF VIEW THAT YOU WANT TO AIR PLEASE WRITE TO THE EDITOR. IF YOUR LETTER IS USED YOU WILL RECEIVE A £5 VOUCHER TO SPEND ON ANY *SWM* SERVICE.

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines.The views expressed in letters published in this magazine are not necessarily those of *Short Wave Magazine.*

Dear Sir
What a most useful contribution Bill Wilson's was in your August issue. I have always found it curious why manufacturers of battery radios do not build in self-contained chargers such as that in his modification. For nearly 20 years, I suppose, I have had a Sony CF-420L, radio-cassette to which I cling because it has this facility.

W.H. Rees
South Godstone

Dear Sir
What are the BBC up to? I will try to be brief.

The long wave station closes for days, the m.w. band is being chopped and given over to advertising, the BBC has begun advertising. The BBC now runs a hype for the f.m. band which is actually untrue. As you know the international agreement is that stations should be in channels of 9kHz. In the m.w. band the transmitters have side-splash which spreads to 15kHz. As you know the Irish station swamps us and blocks Algeria, Finland and Denmark.

The s.w. bands are swamped and many are illegal. Often I have heard three using the same frequency.

The BBC hypes the f.m. band from 85 to 108MHz, but the BBS compresses modulation to avoid overloading and also to narrow the band. The BBC also cross band beams from the same antenna.

Here the f.m. band occupies at least 4MHz for each beam. On 103, 105 and 108MHz all three beams are mixed. And the range of f.m. is around 60-80 miles. I have talked to the BBC engineers here and they have admitted this.

I am getting suspicious that I am being softened up for the BBC to begin to suggest that they might boost income by taking in advertising and that the f.m. band might supersede the m.w. band and in time the l.w. transmitter dropped.

The Daventry transmitter has stopped s.w. signals and the transmission taken over to Woofferton.

John D Berridge, Cardiff

grassroots

Club Secretaries:
Send all details of your club's up-and-coming events to;
'Grassroots',
Lorna Mower
Short Wave Magazine,
Enefco House,
The Quay, Poole,
Dorset BH15 1PP

Acton, Brentford & Chiswick RC: 3rd Tuesdays, 7.30pm. Nov 20 - Feeding Dipole Antennas by G3IGM. Paul Truitt G4WQO. 071-938 2561.

Barnsley & DARC: Mondays, 7.15pm. Darton Hotel, Station Road, Darton, Barnsley. Oct 28 - Planning by G4GJB, Nov 18 - Amateur Radio on a Shoestring by G3RJV. Ernie G4LUE. (0226) 716339.

Bedford & District ARC: Tuesdays, 7.30pm. Allen's Club, Hurst Grove, Bedford. Oct 29 - Social. Glenn G0GBI. (0234) 266443.

Bromley & DARS: 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes. Nov 19 - Stereoscopic slides by G0ILW. Geoffrey Milne. 081-462 2689.

Cheshunt & DARC: Wednesdays, 8pm. Church Room, Church Lane, Wormley, Nr Cheshunt. Nov 6 & 20 - Natter Night, 27th - AGM. Roger Frisby. (0992) 464795.

Conwy Valley RC: 1st Thursdays, 7.15pm. The Studio, Penrhos Road, Colwyn Bay, Clwyd. Nov 7 - Junk Sale. Merfyn Jones GW4NNL, 72b Princes Drive, Colwyn Bay, Clwyd. (0492) 530725.

Coventry ARS: Fridays, 8pm. Baden Powell House, 121 St Nicholas St, Radford, Coventry. Oct 25 - Night on the Air, Nov 1 - Bangers & Mash, 8 & 22nd - Night on the Air, 15th - Mini Lectures. Coventry 523629.

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. Richard Buckby. Ambergate 852475.

Edgware & DRS: Watling Community Centre, 145 Orange Hill Road, Burnt Oak. Nov 28 - The Novice Licence and Club Participation. Hank Kay G0FAB. (081-205 1023).

Fareham & DARC: Wednesdays, 7.30pm. Porchester Community Centre, Westlands Grove, Porchester, Fareham, Hants. Nov 6 - Coding by G0FIM, 20th - Chris G8JFJ. Rod Smith G0ERS. (0705) 373572.

Hastings E&RC: 3rd Wednesdays, 7.45pm. West Hill Community Centre, Croft Road, Hastings. Fridays, 8.30pm. Ashdown Farm Community, Downey Close, Hastings. Nov 20 - Infra-red Imagery by David Watson. Reg Kemp. 7 Forewood Rise, Crowhurst.

Keighley ARS: Thursdays, 8pm. The Cricket Club, Ingrow, Nr Keighley. Oct 31 - Junk Sale, Nov 7 & 21 - Natter Night, 14th - Films. Kathy Bradford. (0274) 496222.

Mansfield ARS: 1st Thursdays, 8pm. The Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. Nov 7 - The Shortwave Broadcast Bands by G4GYU. Mary G0NZA. (0623) 755288.

Midland ARS: 3rd Tuesdays, 7.30pm. Headquarters Unit 22, 60 Regent Place, Birmingham B1 3NJ. John Crane G0LAI. 021-742 8712 (evenings).

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 8pm. St John Ambulance HQ, 61 Emscote Road, Warwick. Nov 12 - Programme Discussion for 1992, 26th - HF Antennas for You by G3OAY. Mike Newell. Kenilworth 513073.

Nelson & DARS: Wednesdays. Llancaiach Junior School, Nelson, Mid Glam. Leighton Smart. (0443) 411736 evenings.

Norfolk ARC: Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norfolk. Oct 30 - Introduction to Microwaves by G4DDK, Nov 6 - REAL RADIO evening, 13th - Satellite TV by G4VCE, 17th - Surplus Equipment Auction doors open 10am, 20th - RAYNET by G0IYD. Jack Simpson G3NJQ. (0603) 747992.

North Bristol ARC: 3rd Fridays. S.H.E. 7, Braemar Crescent, Northville, Bristol. Oct 25 - Bring & Buy, Nov 1 - QSL Cards and Awards 'Boast' Night, 15th - Chips, Bytes & Solder on the Carpet by G0LOJ. J. Chris G0LOJ. (0454) 616267.

North Ferriby United ARS: Sundays, 8pm. North Ferriby United Football Club Social Room, Church Road, North Ferriby. Oct 25 - Basic Test Gear by G3TEU, Nov 1 - Satellites Part 2, 8th - Night on the Air, 15th - RFI Forum, 22nd - Amateur TV. (0482) 650410.

Preston ARS: Alternate Thursdays. The Lonsdale Sports & Social Club, Fulwood Hall Lane, Fulwood. Oct 31 - The Packet Boat, Nov 14 - An Australian Miscellany. Eric Eastwood G1WCQ. (0772) 686708.

Shefford & DARS: Thursdays, 8pm. The Church Hall, Ampthill Road, Shefford, Beds. Oct 31 - Barcoding for Beginners by G1BWW, Nov 21 - Junk Sale. Nigel G1JKF. (0908) 274473.

South Bristol ARC: Wednesdays. Whitchurch Folkhouse Assoc, Bridge Farm House, East Dundry Rd, Whitchurch. Oct 30 - Conquering TVI by G4VBU, Nov 6 - Bring & Buy, 13th - Simple Computer Programming by G4RZY, 20th - Free Ice-cream Evening with G4YZR. Len Baker. Whitchurch 832222.

Southgate ARC: 2nd & 4th Thursdays. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. Nov 14 - Construction Judging for G6QM Trophy & Brains Trust Evening. Brian Shelton G0MEE. 081-360 2453.

Stirling & DARS: Thursdays, 7.30pm. Brain Mulleady. (0324) 36235.

Stourbridge & DARS: 1st & 3rd Mondays. Robin Wood's Community Centre, Scotts Road, Stourbridge. Nov 16 - Annual Surplus Sale. Dennis Body G0HTJ. QTHR.

Stratford upon Avon & DARS: 7.30pm. The Home Guard Club, Main Road, Tiddington, Stratford-upon-Avon. Oct 28 - Oscilloscopes for Beginners, Nov 11 - Amateur Radio Observation Service, 25th - AMTOR Demo.

Three Counties RC: Alternate Wednesdays, 7.30pm. The Railway Hotel, Liphook, Hants. Nov 6 - Best Buys in Amateur Radio Equipment, 20th - On the Air. Dave G4VKC.

Todmorden & DARS: 1st & 3rd Mondays, 8pm. The Queen Hotel, Todmorden. Nov 4 - Drink Driving, 18th - Antennas. Mrs E Tyler. (0422) 882038.

Torbay ARS: Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. Nov 22 - Communications in British Gas. Walt G3HTX. (0803) 526762.

West Kent ARS: 3rd Fridays, 8pm. The School Annex, Albion Road, Tunbridge Wells, Kent. Nov 1 - Informal, 15th - Open Evening. John Taylor G3OHV. (0892) 664960.

West of Scotland ARS: Fridays, 8pm. Scout Shop, 21 Elmbank Street, Glasgow. Oct 25 - CW NFD 1982 video, Nov 8 - Is the RSGB Losing Credibility? Debate, 22nd - Regional Emergency Planning Communications. Jack Hood. (0698) 350926.

Wirral ARS: 1st & 3rd Wednesdays, 7.45pm. Ivy Farm, Arrowe Park Road, Birkenhead, Wirral. Nov 6 - Chairman's Night, 20th - Packet Radio Cluster.

York ARS: Fridays, 7.30pm. York City Social Club, Bootham Crescent, York. K.R. Cass G3WVO. 4 Heworth Village, York.

junior listener

Jon Jones
PO Box 59
Fishponds
Bristol BS16 4LH

Radio Japan

I received a very interesting information pack from Radio Japan that I though I'd share with you. The station is very keen to receive QSLs and even send out a special Air Mail QSL sheet. In addition to simple signal reports, they are keen to receive suggestions for programme material. Radio Japan is similar in some ways to the BBC World Service as its main aim is to improve understanding between Japan and other countries. They claim not to get involved with the propaganda and biased news that some stations transmit. One programme of particular interest is called *Hello From Tokyo* and is transmitted on Sundays. During this programme readers letters are read and questions answered. They even include the occasional live interviews with listeners. The transmission times for this programme are 0515, 0715, 1115, 1415, 1715 and 2315UTC. The frequencies to check for European reception are: 21.575MHz and 11.735MHz.

Radiocommunications Agency

I though you might be interested to hear about some of the work carried out by this government agency. The agency is closely linked to the Department of Trade and Industry and basically looks after the radio spectrum in the UK. As well as looking after the issue of licences, it also has a very active investigation service. This is known as the Radio Investigation Service or RIS. It's main job is to make sure that licensed radio users can operate free from interference. The RIS have a very difficult task as more than 225,000 licences have been issued.

Tracking down interference can be a very tricky operation and the RIS have a special mobile team with equipment for taking measurements at frequencies up to 75GHz. The largest part of the mobile team's work is tied up, not surprisingly, with mobile radio problems.

When investigating problems on the h.f. bands the Radio Monitoring station at Baldock in Hertfordshire plays a major role. This station is continuously manned and provides assistance to foreign as well as UK operators.

In addition to its regulatory role, the Radiocommunications Agency plays an important part in the development and trial of new radio technologies.

As part of their Annual Report they publish a variety of statistics showing how the radio spectrum is used. One area that I found quite staggering was that 37% of the spectrum between 30kHz and 1GHz is dedicated to fixed and mobile links for the government!

If you'd like any more information the Radiocommunication Agency can be contacted at: Waterloo Bridge House, Waterloo Road, London SE1 8UA.

Junior Letters

Fourteen-year-old **Ian Wishart** from Northants has been interested in radio for about eighteen months. His interest was sparked off while listening to the BBC World Service on the car radio during his holiday in France. On his return, he visited the BBC's headquarters at Bush House in London - an experience that boosted his interest. His first reference books comprised *Dial Search* and the *International Radio Station Guide*.

Ian is interested in all aspects of the hobby from local radio through to amateur radio and general short wave listening. However, he has yet to build up courage to send a QSL. On this point, I would strongly recommend that he has a go. One of the benefits, especially with broadcast stations, is that you normally get all sorts of information included with the QSL card. At the very least you will find the station schedule very handy.

Like many junior listeners, Ian's shack is set up in his bedroom and comprises a Saisho SW-5000 short wave receiver and the very popular AOR AR-1000 scanner. Ian feels that he still has much to learn and would like to start with antennas. This is one of the best places to start as you can experiment very cheaply. All you really need is some wire and a little co-operation from your parents! The popularity of do-it-yourself antennas can be gauged by the vast number of books on the subject. Personally, I would recommend that you start by using insulated multi-stranded wire. The reason for this is that it's very flexible and can be made almost invisible when mounted outside. If you want to be scientific in your experiments it's a good idea to keep notes of the basic antenna and the changes you make. You can even make use of the report writing techniques you've learnt at school! The simplest type of antenna to start with is a straight forward long wire. This consists of a random length of insulated wire. This should be as long as possible and preferably in a straight line. However, don't be frighted to include bends if you need to. Throughout all your experiments it's vital that you observe a few simple safety points:

1: Never climb a ladder or any other structure without help from your parents.

2: Always keep antenna wires well away from all other wiring.

3: Don't run antennas above power cables - if the antenna breaks it could contact the power cable with disasterous results.

Returning to Ian's listening, he relies on books and of course the magazine to guide him in his listening. One interesting source of information that he uses is the engineering information pages on Teletext.

Chris Bazley of Rayleigh is also fourteen years old and has collected more than twenty QSL cards from broadcast stations all over the world. His present station consists of a Panasonic RFB-40L receiver with a 20m long wire antenna. Chris has sent me a sample log covering just over one week that I think may be of interest to others. I shown it here as frequency, station name, time and the SINPO report:

5955kHz, R. Netherland, 1430, 44444
6065kHz, R. Sweden, 1717, 42433
6174kHz, R. France, 1605, 43343
6190kHz, R Switzerland, 2130, 32333
5930kHz, R. Prague, 2015, 53434
9765kHz, Spanish R, 2128, 42333
9900kHz, R. Cairo, 2254, 32332
9675kHz, R Polonia, 2256, 44444
11735kHz, R. Belgrade, 0022, 33544
11705kHz, WCSN, 0813, 34444
11705kHz, WSHB, 0612, 23323
13770kHz, WSHB. 2025, 34444
13695kHz, Deutschewelle, 2110, 23322
13605kHz, UAE Abu Dhabi, 2315, 34343

You will see that Chris has used the SINPO reporting system that I covered back in the March 'Junior Listener'. I would strongly recommend that you adopt this system for your loggings as it is accepted throughout the world. This is particularly significant when QSLing with commercial stations.

The final letter for this month comes from **John McElhinney** of Letterkenny in Eire. John has written requesting the sample log sheets I mentioned recently. His receiving set-up comprises a Trio 9R-59DS communications receiver and a 30m indoor long wire antenna.

news

New Panasonic 15in TVs

The TX-15MIT and TC-15MIR are new models from Panasonic which boast excellent picture and sound quality and incorporate an array of new useful functions - including calculator and calendar facility. Designed with the audio-visual user in mind, both televisions have the relevant connections for compatibility with most editing equipment.

They are both equipped with a new Z-4 chassis, which has been purposefully developed for these latest models. This new chassis, for the first time, has allowed Panasonic to incorporate 'Fastext' on a 15in screen (TX-15MIT only), thereby giving users access to useful information at the touch of a button.

Both TVs feature the Invar Mask Tube, which brings exceptional brightness and clarity to the users screen. A 15% brighter screen and no doming, even at high current.

These new models also offer excellent sound quality. This is achieved by the 'Top Dome Sound System'. By incorporating a speaker box and grill in the top of the television, the sound is projected from the top of the unit.

With the on-going quest to provide users with 'user-friendly' equipment, Panasonic have incorporated both calculator and calendar facilities. The remote control unit features a 'menu' button. By pressing this and then selecting Calculator, the user has all the usual calculator functions on the screen. The calendar function gives users both the day and date of a particular year. The calendar has a 200 year scan.

These models will be available from October 1991 from authorised Panasonic dealers nationwide. The TX-15MIT will sett at about £299.96 and the TC-15MIR about £249.95.

The Valve Catalogue

This catalogue will be available soon from The Vintage Wireless Company Ltd and will cost £2.00 post paid UK or £3 post paid overseas. The cost is refundable with your first purchase.

There will be valve lists and prices, equivalents (including rare European), military code explanations (USA, RAF, Army & Navy), used valves available, valve cartons, valve holders, accessories, miscellaneous, valve holder guide, valve manuals, etc.

A refund coupon will be enclosed with each catalogue and you deduct the cost from your first valve purchase made from the catalogue.

All customers who have already send an s.a.e. for what was to be a normal valve list, and has now turned out as a much grander affair, please do not send additional funds. Your s.a.e. will be accepted as payment, but no refund slip will be enclosed.

The Vintage Wireless Company Ltd. Tudor House, Cossham Street, Mangotsfield, Bristol BS17 3EN.

DX TV News

Though TVDXers have been using v.i.t.s. (vertical interval test signals i.e. the series of lines and dots at the top of the TV picture) to assist with station identification, recent observations by Dalibor Frkovic in Yugoslavia suggests that Arabic signals are less than certain. For example, Iran has been seen using no v.i.t.s., thin v.i.t.s. lines and standard (European) type v.i.t.s. suggesting that use is random and it's unwise to rely too much on v.i.t.s. for identification.

The TV2 group in Norway have been awarded the commercial TV franchise that will last for 10 years and hopes to start transmissions Autumn 1992. The new network will be based in Bergen, from where the transmitter network will expand. Meanwhile, the proposed Irish TV3 network is still in limbo pending amendments to the Broadcasting Act which will remove advertising restrictions that were reducing advertising revenue and could have made the TV3 commercial network unviable. At the end of August, the TV3 consortium were considering putting on hold any further progress due to the poor financial conditions prevailing.

The Greek government is, at last, to introduce legislation in an effort to control the rash of private radio and TV stations that have spread throughout the country, not unlike Italy of some years ago. This should result in a large scale reduction of stations, at least 26 TV stations were operating in Athens at the end of July, with scant regard to interference protection. The new powers should halve the TV stations now operating and up to 75% of radio stations will also disappear. There are thought to be only 13 available channels in the Athens area with ERT (the national broadcaster) taking 3, RIK (Cypriot channel) a 4th and with several main satellite channels taking other terrestrial outlets.

Tele Piu, the new Italian broadcaster, has experienced a successful start to the broadcasting field with considerable consumer uptake in her 3 channel subscriptions. Over $50million has been spent so far with a further $400million up to 1994. The scrambled mode used on the Pay-TV network is the Irdeto system.

Roger Bunney

Broadcasts to Yugoslavia

The BBC World Service is splitting its Serbo-Croat output into separate Serbian and Croatian transmissions from the end of September. This means that the BBC will then be broadcasting to Yugoslavia in three languages in addition to English. It has been broadcasting separately in Slovene since WWII. The latest change was planned in January and comes into effect on September 29.

The move will be welcomed by potential rebroadcasters in Yugoslavia who require separate Serbian and Croatian programmes rather than the combined Serbo-Croat output that the BBC has traditionally broadcast on short wave. Five radio stations in Slovenia already rebroadcast BBC Slovene programmes but none in Croatia or Serbia is using Serbo-Croat broadcasts.

The changes will mean that Serbian and Croatian will each be broadcasting for five and a half hours a week. Slovene will remain at five and three quarter hours. Short wave broadcasts will continue in all three languages and the programmes will be beamed from London via satellite for downlinking by local f.m. and a.m. radio stations.

The new pattern of broadcasts will be (local times):

1200-1215 - Slovene; 1230-1245 - Serbian; 1300-1315 - Croatian; 1800-1830 - Serbian; 1830-1900 - Slovene; 1900-1930 - Croatian.

MULTICOM.EXE

MULTICOM.EXE is a program to drive an Icom radio. It requires an IBM PC, EGA graphics (256K minimum), one serial port plus any Icom radio with a CAT port.

The program comes supplied with a simple interface, although any other suitable interface may also be used. It also comes with set-up files for the IC-735, IC-726, IC-781, IC-765, IC-751, IC-575, IC-275, IC-475, IC-1275, IC-R9000, IC-R7000, IC-R71 and a few more. These files may be altered, renamed, loaded and saved from within the program. Also, new files may be created to accommodate future products.

A few of the features of the program are: it operates in the frequency range of 10Hz up to 10GHz, allows for frequency converter/transverter use, scans up/down by the cursor keys, scan speed and tuning step size are pre-selectable before scanning, easy to use graphic program amongst other features.

If you would like more details on this program, which costs £50. Then contact:

Ivor Mantell, 24 Bourne Avenue, Fazeley, Tamworth, Staffs B78 3TB.

news

International Short Wave League

The International Short Wave League (ISWL) was formed in 1946 and for 45 years has provided facilities enabling members to enjoy their hobby to the greatest advantage to themselves and fellow enthusiasts.

The League effectively caters for members interested in both the amateur and broadcast bands, membership being equally open to licensed amateurs and s.w.l.s. Published monthly and issued to members, the League journal *Monitor* includes coverage of the h.f., v.h.f. and broadcast bands, transmitting topics and general interest articles.

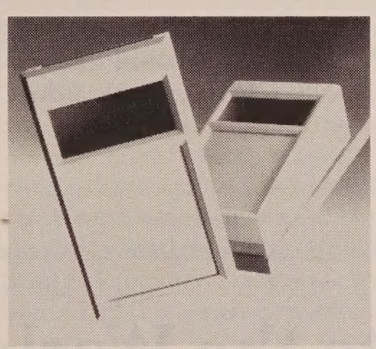
For full details on the ISWL membership, send an s.a.e. to:

Evelyn May G-17197/G0OZI, ISWL HQ, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

Elegant Console

Elegant, from Bopla, is an enclosure for hand-held instruments. It is moulded from high impact polystyrene, with a two-tone light grey finish. The main feature of the new Elegant Console is a sloping display panel that can accommodate a membrane keyboard. Also new is the increase in depth that allows more components to be accommodated and makes the unit ideal for mobile data acquisition equipment.

The key area is 87 x 105 x 2mm and the display area is 87 x 38.5mm. Mounting bosses are provided for standard 16-character and 4-line displays. Presently, only available in one size, but smaller versions are currently being developed.



Bopla Ltd, Phoenix Mecano House, 6-7 Faraday Road, Aylesbury, Buckinghamshire HP19 3RY. Tel: (0296) 399 999.

Radio Stations in the UK

The 1991 edition of the *Radio Stations in the United Kingdom* has just been published by the British DX Club. The booklet is now in its 10th edition and follows the successful format of previous years. It has been completely revised and updated to reflect the current situation.

In frequency order, the booklet lists all British m.w. a.m. and f.m. radio stations - both BBC and ILR - including their location and transmitter power. To help with identification, each frequency is cross-referenced to show possible parallel channels. A reference section gives the full postal address and telephone number of each station, as well as background information on the various Development licences, 'unofficial' radio and reception reporting.

The booklet costs £2, 5 IRCs or $4 per copy. This includes postage worldwide.

British DX Club, 54 Birkhall Road, Catford, London SE6 1TE.

British DX Club

The British DX Club's monthly bulletin *Communication* celebrated a milestone in July, with the publication of its 200th edition. The first issue of *Communication* appeared back in September 1974, since when it has supplied British DX Club's ever expanding membership each month with up-to-date information and tips on broadcast band DXing.

Details of membership and a sample copy can be obtained for return postage from the Club Secretary.

Colin Wright, British DX Club, 54 Birkhall Road, Catford, London SE6 1TE.

rallies

***October 25 & 26**: The Leicester Amateur Radio Show will again be held at the Granby Halls, Leicester.

***November 2/3**: The 5th North Wales Radio & Electronics Show will be held at the Aberconwy Conference Centre, Llandudno. The rally opens at 10am with the entrance fee at £1, OAPs 50p and children under 14 free of charge. **Siggy Fergusson GW0DYH. Tel: (0492) 532459 (day). Tony Wilkinson GW4PVU. Tel: (0492) 49121 (evenings).**

November 10: Barnsley & District ARC will be holding their first Radio Rally at Willowgarth Senior High School, Brierley Road, Grimethorpe, Barnsley, South Yorkshire. Details and trade enquiries from **Ernie G4LUE, 8 Hild Avenue, Cudworth, Barnsley, South Yorkshire S72 8RN. Tel: (0226) 716339 (6-8pm).**

***November 17**: Bridgend rally. Further details from **Charles Sedgebeer, 50 Minffrwd Road, Pencoed, Mid Glamorgan, South Wales CF35 6SD.**

November 24: The West Manchester Radio Club's 'Winter Rally'. All details as August Rally. Admission £1. **Dave G1IOO on (0204) 24104 evenings only.**

December 1: The Bishop Auckland RAC are holding their rally at the Sunnydale Leisure Centre, Shildon, Co. Durham. Doors open 11am (disabled 10.30am). **G0FBK. Tel: (0388) 606819.**

***December 15**: The Centre of England Amateur Radio Rally will be held at the British Motorcycle Museum, Bickenhill, near the NEC Birmingham (junction 6 M42). Doors open 10.30am, admission £1, OAPs 50p, children free. Over 60 trade stands in three large exhibition halls, Bring & Buy, talk-in on S22, bar and restaurant available, ample free parking, concessionary rates to visit museum. **Frank Martin G4UMF. Tel: (0952) 598173.**

1992

January 26: The 2nd Lancastrian Rally will be held at the University of Lancaster. Doors open 10.30am for the disabled and 11am for everyone else. **Sue G1OHH. Tel: (0524) 64239.**

February 16: The Kidderminster & DARS rally will be held at the Harry Cheshire School, Habberley Road, Kidderminster, Worcs. Doors open 10am. **G8JTL. Tel: (0384) 894019.**

February 23: The Northern Cross Radio Rally will be held at Rodilian School, Lofthouse, West Yorkshire.

March 7: The TARS annual rally will be held as a new venue this year, the Temple Park Leisure Centre in South Shields. **Jack G0DZG. Tel: 091-265 1718.**

April 5: The Launceston 6th Amateur Radio Rally will be held at Launceston College. Doors open 10.30am. **Maggie. Tel: (040921) 219.**

***June 14**: The Royal Naval ARS will be holding their annual rally at HMS Mercury, near Petersfield, Hants. Gates open from 10am to 5pm. **Cliff Harper G4UJR. Tel: (0703) 557469.**

November 28: The Greater London Amateur Radio & Computer Show will be held at Harrow Leisure Centre, Christchurch Avenue, Harrow, Middlesex. Doors open from 10.30am to 4.30pm. **CLPK. 18 Litchfield Close, Clacton-on-Sea, Essex CO15 3SZ.**

*** Short Wave Magazine & Practical Wireless in attendance ***

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The NRD-535 with a subtle difference

The NRD-535 is accepted as one of the outstanding HF receivers in the world and we, at Lowe Electronics, are proud to be a JRC specialist distributor.

Good as it is, we felt that even the NRD-535 could be "breathed on" and we have produced an upgrade series of modifications which makes the NRD-535 into a real stunner.

The improvements include a specially designed high-performance IF crystal filter, detailed flattening of the audio response, a completely new higher-power audio output amplifier and, if the ECSS unit is fitted, modifications to the PLL system giving greater lock stability.

Each NRD-535 which has our upgrade treatment also has a pre-aging period for settling down the master reference oscillator and a careful check of detailed alignment to ensure that the "Lowe" NRD-535 is as near perfect as any receiver can be.

You CAN tell the difference with your ears. Contact us for details and cost of this worthwhile step-up for the NRD-535; available from Lowe Electronics only.

HF-225 Gateway to the World

* 30kHz – 30MHz
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* 30 memory channels
* IF filters for all modes already fitted
* Keypad & tuning knob freq. control
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Send four first class stamps to cover the postage and we will send you, by return, your FREE copy of 'THE LISTENERS GUIDE' (2nd edition); a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in a 'good read'; but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

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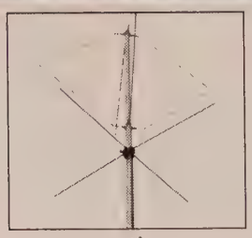
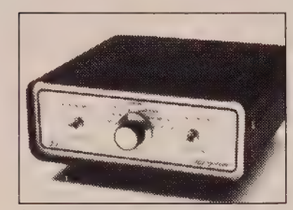
Aerial systems for Serious Listeners
Lôôk to Lowe



DX-One Electronic Antenna

£254 inc VAT

The World Radio TV Handbook said of the DX-One "... the best of its type available anywhere in the world." It has a frequency range of 50kHz - 50MHz (*3dB) and 10kHz - 75MHz (*6dB); it is both horizontally and vertically polarised, so low-angle (DX) signals suffer less selective fading. The output level from the antenna is adjustable in steps from +6dB to -4OdB for optimum matching. The extremely high intercept point (+66dBm 2nd order, +40dBm 3rd order) and a very low noise figure (12.8 dB) ensure optimum performance. The indoor unit contains a mains power supply, a step-wise attenuator and a very effective medium wave suppression filter. It also has two receiver outputs for feeding two receivers without mutual interference.



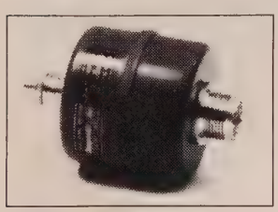
SP-2 Antenna Splitter

£152 inc VAT

A growing number of radio enthusiasts have two receivers, but no space for two separate antennas. The SP-2 is the answer for connecting two receivers to one antenna (be it active or passive). The SP-2 offers a very high degree of isolation between the two receivers (<30 dB). The SP-2 ensures that, within the frequency range of 50kHz - 50MHz), no unwanted mutual interference, heterodynes or signal loss will occur as a result of connecting a second receiver.

With a single receiver, the SP-2 offers a precision step-attenuator (0 - 40 dB) which helps to reduce receiver inter-modulation. Included is a very effective switchable medium wave suppression filter.

For those with space for a second antenna (e.g. one horizontal, one vertical), the SP-2 offers a simple way to switch between the two for comparison purposes.

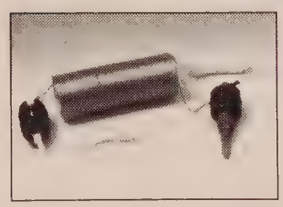


Magnetic Longwire Balun

£36 inc VAT

This balun has been described in the trade press as the "most revolutionary development for shortwave listeners in the last 25 years". Quite a claim! But this antenna device does solve one of the most severe problems associated with random long wires; the input cable. An MLB allows you to use highly screened co-axial cable between the antenna and receiver WITHOUT energy loss due to impedance mismatch. Computers, light-dimmers, televisions, and fluorescent lights no longer cause interference problems. We recommend RG58/u 50ohm co-axial cable.

The MLB has been designed so that a very short length of antenna wire can be used and still be perfectly matched to the 50ohm antenna input of the receiver. Even an antenna of just 12.5 metres (41 feet) provides good results from 100kHz - 40MHz without the need for an antenna tuner. Static build-up on the antenna is allowed to leak away to earth potential - excellent for protecting receivers with FET front end circuitry. Static noise levels on long, medium, and the tropical short wave bands of 60 & 90 metres are considerably lower. The MLB is easy to mount on existing longwire or "T" antennas.



MLB Antenna: Mark I

£56 inc VAT

A complete passive wire antenna with a built-in MLB, the MLB Antenna: Mark I has excellent performance on long, medium, and short waves. It is 12.5 metres in length and can be mounted vertically or horizontally. Frequency range 100kHz - 40MHz.

The MLB Antenna: Mark I offers all the advantages of the Magnetic Longwire Balun like: coaxial feeder, broadband performance without an antenna tuner and static decoupling. Heavy duty and completely water-proof, it comes complete with nylon support cord, heavy-duty insulator, high-quality plastic covered antenna wire, PL 259 connector and a water-tight rubber sleeve to cover co-axial/MLB connection.

MLB Antenna: Mark II

£67 inc VAT

Similar to the Mark I, but 20 metres long. The MLB Antenna: Mark II offers improved performance at medium and long wave frequencies, although the high frequency performance above 30MHz is reduced.

THE LISTENERS' BOOK OF THE YEAR GETS EVEN BETTER

The new 1992 issue of 'Passport to World Band Radio' is now with us and it's even better than before. The 200 pages have risen to almost 400 and every section carries the unmistakable authority of the world's best short wave companion.

Broadcasts are listed as before; not only in frequency order but also by language, country of origin AND the times of broadcasts. There are no less than 56 pages of receiver reviews, including the latest NRD-535 and Drake R-8, together with news, views and general information.

If you own a short wave radio, you simply MUST have the 'Passport' by its side. The price last year was £12.95; we have kept the price exactly the same this year at £12.95 (plus £1.55 for post and packing). Send off today.

Barry (S Wales): 0446 721304 ***Bournemouth**: 0202 577760 **Bristol**: 0272 771770 **Cambridge**: 0223 311230
Cumbernauld: 0236 721004 ***Darlington**: 0325 486121 **London (Heathrow)**: 0753 545255 **London (Middlesex)**:081-429 3256
**Closed all day Monday*

5XX
Wonder Station of the 1920s

It is now sixty-six years since the official opening of the ultra-powerful Daventry transmitter on 27 July 1925 and most listeners could henceforth tune-in an alternative programme - London - in addition to their local station. By contemporary standards, this was listening affluence.

In the two-and-a-half years that had elapsed since the British Broadcasting Company started operations in November 1922, nine main stations and ten relay stations had been built around the country. The relay stations were low-powered transmitters that boosted the local programme in areas where reception was particularly poor.

Since neither the transmitters nor the domestic receivers were very powerful, the owner of a radio could usually tune-in only the local station. In the south-west, for instance, this was usually Cardiff 5WA on 351 metres (854.7kHz), which was considered a somewhat high-brow station. But most British listeners hankered after the more prestigious London programme, to chuckle at the nonsense of comedian George Robey and tap their feet to the rhythm of the Savoy Orpheans dance band. Eventually, to satisfy this demand, most local programmes did include some material from London.

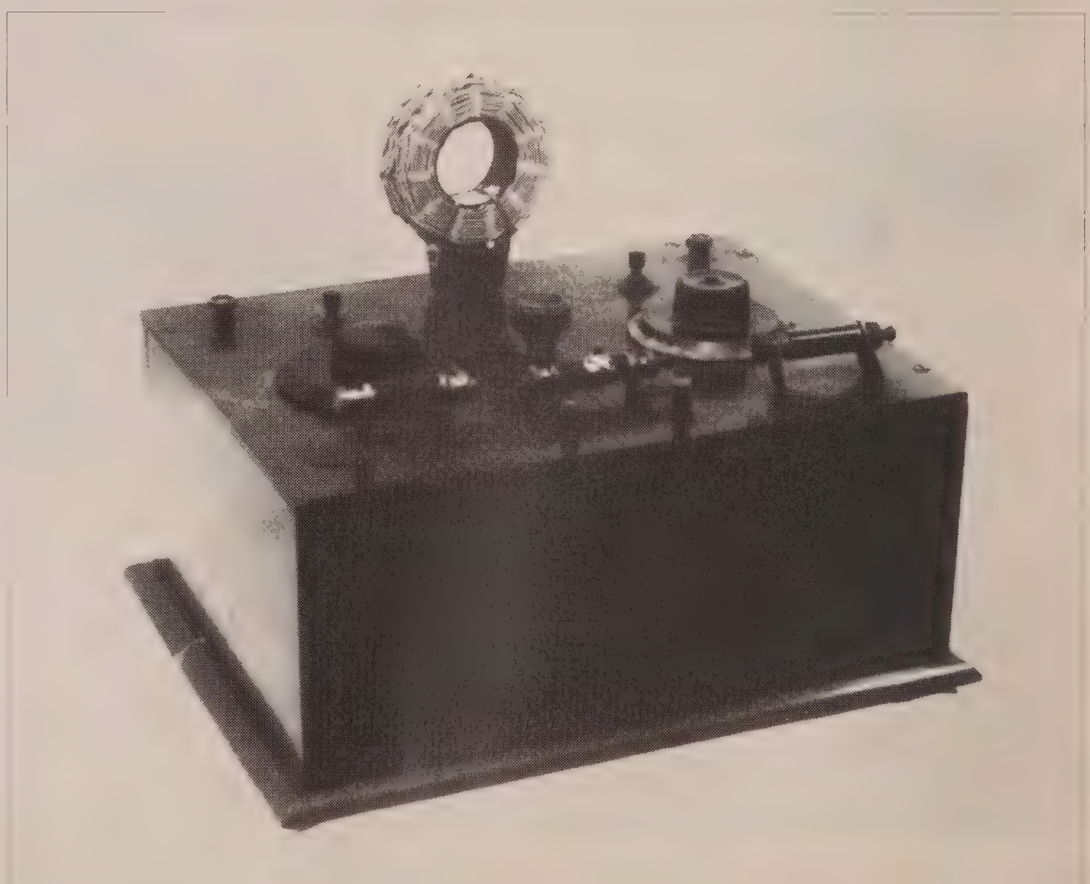
By August 1924, about two-thirds of the population were in a position to receive their local station on a cheap and simple set, if they owned one. The BBC had always envisaged the listening public as owning simple crystal sets that required no expensive batteries or components, but operated entirely from the power received from an outdoor antenna up to 31m long and often 12m high. Countless such antennas, many of them unsightly, festooned the gardens and backyards of the towns. Now the authorities were concerned to make a programme available to the 30 to 40% of people - mainly country dwellers - who could not yet receive any programme.

The idea of a very high power station that would enable people as far as 160km away to pick up its programme on a crystal set, was first put forward in December 1923. The projected station was to have a wavelength of between 1400 and 2000m (214 and 150kHz), instead of conforming to the accepted 'broadcast range' of 250 - 500m (1200 - 600kHz), since long wave stations could be received at far greater distances than medium wave transmitters. The BBC applied to the Post Office for a temporary licence to make experimental transmissions from the Marconi works at Chelmsford, Essex, where British broadcasting had begun. From July 21 onwards, the London programmes were relayed nightly after seven o'clock.

Obstructive

At first, the Armed Services were obstructive, as they had previously been to the whole idea of broadcasting. Eventually, they reluctantly agreed to a long wave station working on 1500m (200kHz), situated north of a line from the Severn to The Wash, with power not greater than 25kW. Until the new station was built, Chelmsford could continue broadcasting the London programme after 7pm.

It was decided to situate the giant station in the Northampton district, and BBC engineers were sent to survey



A luxurious home-built crystal set having a choice of three different crystals and other refinements. On top can be seen the long wave '5XX' coil that was switched in to receive Daventry. Sixty-six years later the set still works perfectly.

Sixty-six years ago this summer, two million British licence holders twiddled the knobs of their crystal sets and primitive valved receivers with more than usual eagerness. Eric Westman tells why.

possible sites. They soon pronounced one, at Borough Hill, 1.2km from Daventry, as 'pre-eminently suitable'. It consisted of a flat expanse of more than 50 acres at a height of about 200m above sea level. The BBC bought it for £2670 freehold. Work started straight away, to be finished early in the summer of 1925. A high quality land-line from the capital enabled it to radiate the highly esteemed London programmes from a massive antenna that was held aloft by two steel masts 150m high and 245m apart. It was the most powerful broadcasting station in the world, as well as the first on long wave. Since all transmissions bore callsigns, Daventry was allotted the combination 5XX - the double X referring to its special and experimental nature.

Although Daventry actually started broadcasting on July 21, it was officially opened six days later on July 27, by Sir William Mitchell-Thomson, the Postmaster General. To commemorate the opening, the Poet Laureate, Alfred Noyes, wrote a stirring poem, *The Dane-Tree*, which was broadcast. The final verse went:

"Daventry calling... Daventry calling...

Daventry calling... Dark and still.

The tree of memory stands like a sentry....

Over the graves on the silent hill."

With the opening of Daventry, the BBC now provided at least one programme to 85% of the population, even if they owned only crystal sets. And those who aspired to one-valve sets could receive the station from as far away as 240-320km. Indeed, a large number of listeners now had the choice of two programmes.

Saviour

There was one very important spin-off from the setting-up of 5XX that had a most beneficial effect on the British radio industry. Britain was being flooded by excellent radios from the USA, whose radio industry was more advanced than ours. But the American sets were not built for long wave reception, and so could not bring in Daventry. All the new British sets were provided with a switch to enable reception both of the medium waves, with their local station, and of the long waves - thus bringing in Britain's most desired programme. Lacking this facility, American sets no longer sold, and Britons resumed buying British-made equipment - or making their own. Daventry proved to be much more than an alternative programme, it became the saviour of the British radio industry.

The new station also provided the first controversy over BBC pronunciation. Local people, for historical reasons, had always pronounced the name of the district as 'Dane-tree', but the BBC insisted upon pronouncing it as it was spelt. But to all listeners, however, they pronounced it, Daventry was the greatest event that had occurred since the formation of the BBC. Nothing equalled it until the mass arrival of television. ■

Abbreviations

BBC	British Broadcasting Company (later Corporation)
kHz	kilohertz
km	kilometres
m	metres

Your Comments...

Dear Sir

September *Short Wave Magazine* has been brought to my notice, and I read with great interest the article on the EF50. There are some comments I would like to make. The valve was developed in Holland before the war, see *Wireless World* for 16 February 1939, and incorporated in the Pye 45MHz straight television receiver. This was much used in airborne radar as an i.f. amplifier. Reference to the *Wireless World* article will show that the valve originally had no screening can and had locking pins.

Your photograph shows the production versions. Mullard denied that there ever was a different prototype, which was rather unfortunate since I have one, marked with a proviso that it is a prototype and production could not be guaranteed.

I also have a prototype EE50, of similar appearance. This valve is adequately described in *Wireless World* for 20 April 1939, but it never really caught on. The EF50 managed an adequate mutual conductance without recourse to secondary emission.

Incidentally, the ratio of mutual conductance to input capacity is generally regarded as the criterion of goodness for r.f. amplification, noise factor also being important and the RL7 (VR136) was the European leader at the time. However, the RL7 was not suitable for pulse circuits, and cost more, therefore it was used for head amplifiers only. The EF50 was the op-amp of that era, as I explained in an article on the Anode Follower in *SWM* some time in the late forties, when Austin Forsyth was the editor.

R. Brett-Knowles G3AAT
Havant

Educational Software for Basic Electronics - Part 9

J.T. Beaumont G3NGD continues this series with some programs to teach students about mathematical formulae.

Transposition of Formulae

This program is a 'self-learning tutor'. When program is RUN, the student may choose any of the following options which are listed in a menu.

1. Transpose symbols connected by a Plus or Minus.

2. Transpose symbols connected by a Product.

3. Transpose symbols connected by a Quotient.

4 Perform Cross-multiplication.

5. Transpose symbols connected with Brackets.

6. Transpose symbols connected with Reciprocals.

7. EXIT from the program.

After a demonstration of the techniques involved, the student is given the opportunity to transpose the formulae on a line-by-line basis. The same question can be repeated if necessary.

Simultaneous Equations

This program helps teachers and students to check their answers when performing calculations involving simultaneous equations.

From the screen lay-out (S.22), it can be seen that the actual question appears on the screen at the same time as the answer. This is programmed using the procedure DEFPROC-Setup. Here, use is made of the function 'ABS', which means absolute value. (This turns a negative number into an equivalent positive number).

In lines 480 to 490 the values of (Y) and (B) are represented by (Q) and (R) respectively, and are both positive. Variable A$ and B$ are used to insert a plus or minus sign if that is the case. (Q and R are only used in printing the question). After entering the numbers, which can be either positive or negative, you should press the RETURN key.

Simultaneous Equations.

$7x + 4y = 41$
$4x - 2y = 2$

$x = 3$
$y = 5$

Press the space-bar to continue

S22 is shown above with S23 below.

Quadratic Equations.

$ax^2 + bx + c = 0$

The Formula is:

$$\frac{-b \pm \sqrt{b2 - 4ac}}{2a}$$

$3x^2 + 8x + 2 = 0$
$x = 2.39 \text{ or } 0.28$

Press the space-bar to continue

Quadratic Equations

This program helps teachers and students to check their answers to calculations involving quadratic equations.

The program prints the question on the screen in a similar manner to that shown in the last program (P22). Use has been made of 'User Defined Graphics' so enabling the formula to be printed on the screen (S.23).

At line 330, the print format of the computer (0) has been set so as to give the answers to two decimal places.

In this program use has been made of 'Functions'. Functions are similar to 'procedures' but always give a calculated result; in this case FNPOS(X) and FNNEG (X) performs the calculation when the equation is positive or negative respectively.

```
350 PRINT x = FNPOS
    (the calculation is
performed below)
430 DEF FNPOS(X)
440 X=(-B+SQR((B 2) -
(4*A*C))) / (2*A)
450 = X
```

When solving engineering problems, it is possible to have roots with negative numbers It is not possible to find the value of the square root of a negative number, and when this is encountered the negative numbers are represented by the symbol **j**. (Pure maths books tend to use the symbol **i**, but in engineering books **j** is used because symbol **i** represents the value of the instantaneous value of current). If, for example, the answer to a problem was x=2.00 + j3.00, then the number 2.00 is called the real part and j3.00 is the imaginary part. The expression x + jy is called a complex number.

The complete suite of programs is available on a 5¼in 40 or 80 track floppy disk direct from *Short Wave Magazine*. The software is only available for the BBC Computer, price £8.95 post free.

MARTIN LYNCH

G4HKS

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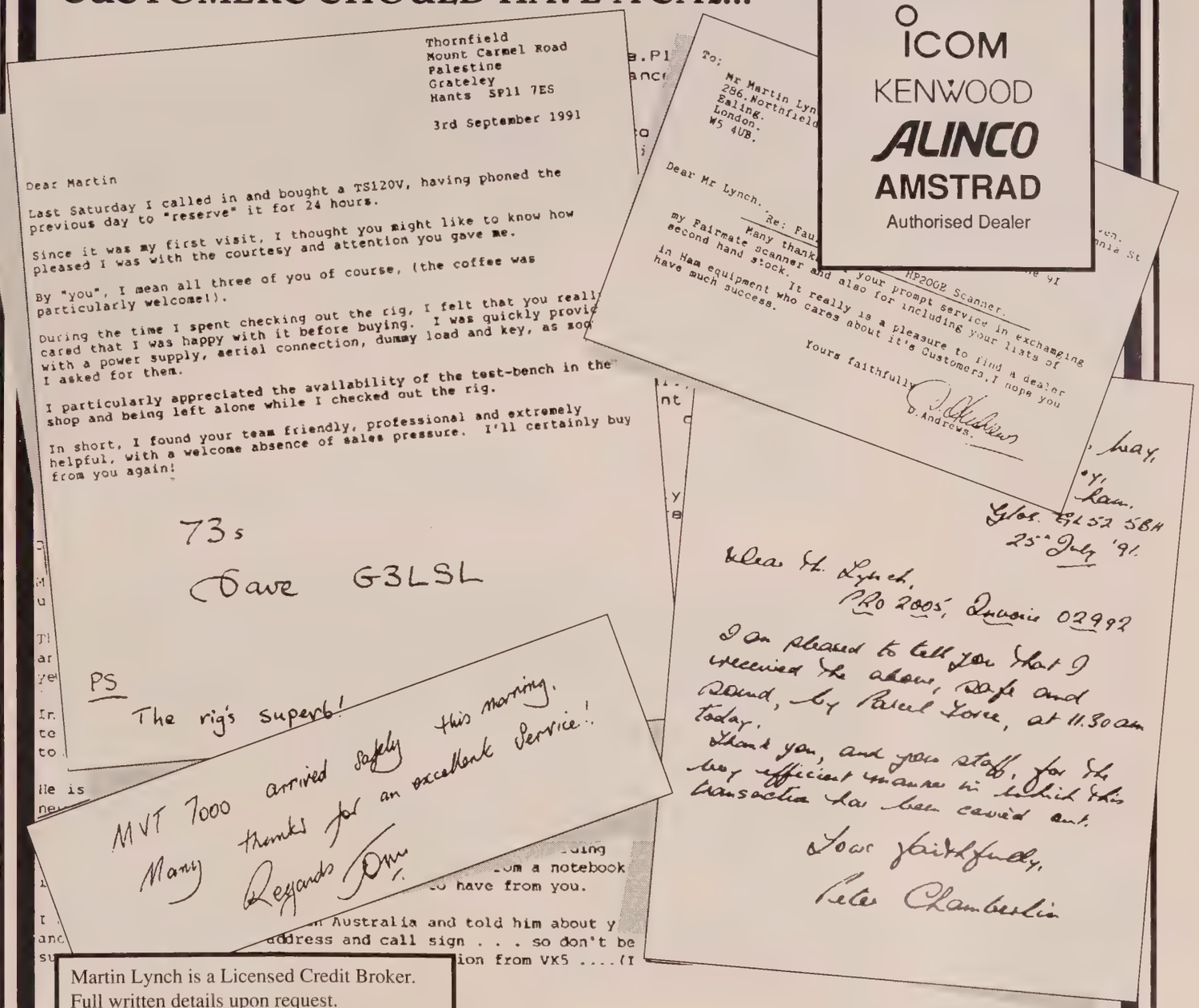

Thornfield
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Palestine
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Hants SP11 7ES

3rd September 1991

Dear Martin

Last Saturday I called in and bought a TS120V, having phoned the previous day to "reserve" it for 24 hours.

Since it was my first visit, I thought you might like to know how pleased I was with the courtesy and attention you gave me.

By "you", I mean all three of you of course, (the coffee was particularly welcome!).

During the time I spent checking out the rig, I felt that you really cared that I was happy with it before buying. I was quickly provided with a power supply, aerial connection, dummy load and key, as soon as I asked for them.

I particularly appreciated the availability of the test-bench in the shop and being left alone while I checked out the rig.

In short, I found your team friendly, professional and extremely helpful, with a welcome absence of sales pressure. I'll certainly buy from you again!

73s
Dave G3LSL

PS
The rig's superb!

To:
Mr Martin Lyn
286, Northfield
Ealing.
London.
W5 4UB.

Dear Mr Lynch. Re: Fau

Many thank
my Fairmate scanner and also for including your lists of
second hand stock. It really is a pleasure to find a dealer
in Ham equipment who cares about it's Customers, I hope you
have much success.

Yours faithfully
D. Andrews.

HP200E Scanner.

MVT 7000 arrived safely this morning.
Many thanks for an excellent Service!
Regards Tom.

Glos. GL52 5BH
25th July '91.

Dear M. Lynch,
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I am pleased to tell you that I received the above, safe and sound, by Parcel Force, at 11.30 am today.

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73 MARTIN G4HKS

Improving Short Wave Broadcast Reception

If you have two antennas for the reception of an a.m. short wave broadcast signals, you may have noticed that the fading and distortion occur on each antenna at different times. It follows that combining the two signals should improve the quality of reception. R. A. W. Hill GM0IJF describes a simple and easily constructed circuit for doing just that.

The idea of using several antennas simultaneously to combat fading dates back to the early days of radio. Because the antennas were sometimes miles apart and the relative phases of the signals indeterminate, signals were received and detected separately, often with a common a.g.c. system, before being combined. In the system outlined here the signals are, in fact, combined directly, with suitable phasing, before being passed to the receiver. An important aspect of the design is that the antennas are isolated from one another electrically by a resistance network that also allows adjustment of the relative levels of the two signals. This is important, since, if the two antennas were simply connected together so that current could flow freely from one to the other, we would have a third antenna, with its own fading and distortion pattern, probably no better than those of the two separately.

For many purposes the loss of signal in the level and phasing networks is not significant, but in this connection it can be mentioned that the circuit is best suited to listening to rather strong signals for considerable periods of time, since 'selective fading'. which is so fatiguing to the ear, is noticeably reduced.

Practical Circuit

The circuit shown in **Fig. 1** is for two 'random wire' antennas. It has facilities for adjusting the level and phase of both signals, as well as a switch position which by-passes the tuned circuit, should no phase shift be required. To use the phase shift, the capacitor is first tuned to resonance (fr) by getting a signal minimum. Tuning to either side of resonance (f_r), to about $0.9f_r$ or $1.1f_r$, then gives an appreciable phase shift (with some attenuation) of perhaps ±75°, depending on which way the capacitor is turned.

The circuit *Q* should be high, which means that the capacitance should not be too large: 100-200pF seems to work well. Also, the *Q* of the coil itself should be high and 22s.w.g. wire on a 25mm former, with plenty of taps, selected by S3 and S4, is satisfactory. This allows coverage of a range of frequencies, while keeping the capacitance within the range mentioned.

During adjustment of the circuit, the switches S1 and S2 need to be quickly and easily operated. A crocodile clip on the antenna wire, to be clipped onto a piece of stiff wire protruding from the unit, is very convenient for this purpose.

The 200Ω resistors are for isolating the antennas from one another, as already mentioned. The use of logarithmic potentiometers allows smooth adjustment of the two signal levels.

The connection to the receiver should be by the shortest possible length of low capacitance coaxial cable. If available, a good direct earth should be connected to the unit, not the receiver.

Adjustment of the Circuit

Adjustment for a chosen station can be done in several ways, according to preferences and previous experience, but the aim must always be to get the two

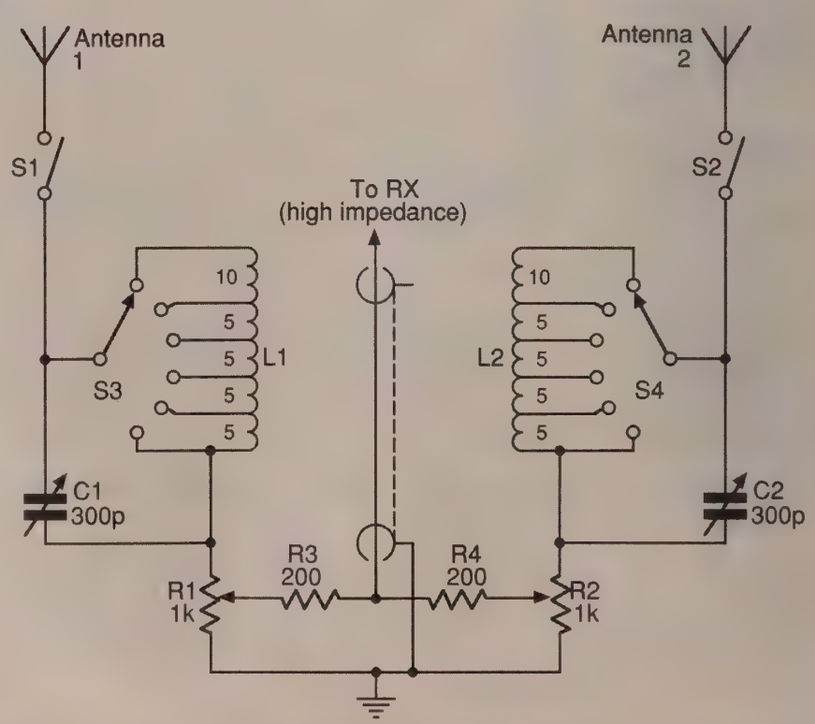


Fig. 1.

YOU WILL NEED

Resistors
0.25W Carbon Film 5%

200Ω	2	R3,4

Potentiometers

1kΩ *log*	2	R1,2

Capacitors
Variable

0-300pF	2	C1,2

Switches
Rotary

1p6w	2	S3,4

Miscellaneous
22s.w.g. enam. copper wire; 25mm dia. former; Plastics box. Knobs (6).

signals at the receiver at the same level, and fairly closely in-phase. A rather rough adjustment may result in an audible improvement, but it is a good idea to aim for a situation where disconnecting either antenna shows a noticeable decrease in signal of a few dB, as indicated on the S-meter. If connecting a second antenna results in a decrease in signal, the two components must be out of phase, and if this decrease is large, the phase difference must be approaching 180°. In this case noting the settings of the controls, and then shifting the phase and level controls accordingly, can be a useful approach to getting good results.

Suitable Antennas

Fading patterns of antennas may differ because they are differently located, or because they respond differently to the plane of polarisation of the incoming wave. Polarisation effects of considerable importance have been reported by B. Sykes G2HCG (*Practical Wireless*, November 1989, p26). In the tests reported here one antenna was a wire running as directly as possible, vertically, to the highest point of the house, the other a rectangle of 100m of wire, at a height of about 5m, both ends of which are available at the receiver. Either end, or the two connected together, could be used, giving useful flexibility when adjusting phase. ■

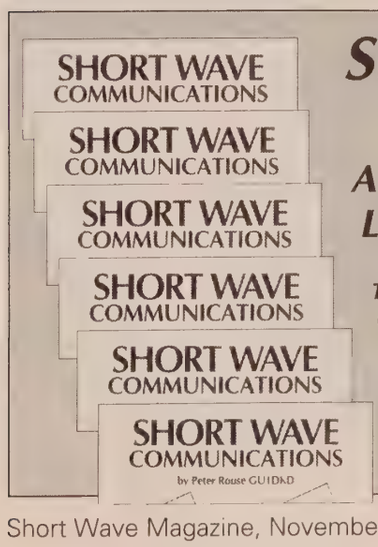
Results

The prototype unit, built in a plastics box, works satisfactorily between 4 and 15MHz. At higher frequencies some screening may be necessary.

The Lowe HF-125, was used, usually in the synchronous a.m. mode. With this refinement, some remarkably good programme quality has been achieved.

Stations investigated include All India Radio on 11.620MHz and Deutsche Welle on 6.075 and 9.545MHz. Phase and level settings for Deutsche Welle have been shown to remain remarkably constant from day to day.

The success of these test depends on subjective aural judgement and I am indebted to Mr Graham Perry GM0EFC and to Dr Wolfgang Korner, both experienced listeners, for their assistance in assessing the circuit performance.



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Tuning in to the Secret Broadcasters - 2

In this concluding part, Gerry L Dexter surveys the current clandestine scene with frequencies and times of known transmissions.

To get you started, here is a survey of what's out there, presented alphabetically, by target country. Remember that new stations are always coming on the air and current stations departing. Times and frequencies fluctuate and transmissions may not occur on a daily basis or may be altered at weekends. Addresses of stations or the groups operating them are included where known. Languages used have not been specified but may be assumed to be in the language(s) or vernaculars of the targeted country, e.g. most anti-Iranian clandestines broadcast in Farsi. Times are given in UTC.

Afghanistan - Afghanistan Mojahedin Radio. 6.140MHz at 0200-0330 and 1230-1400.

Afghanistan - Radio Free Afghanistan, via RFE/RL. 7.255 and 9.555MHz, 0230-0300; 9.540 and 11.770MHz, 0230-0330; 17.895, 21.510 and 21.530MHz at 1330-1430. Address: RFE/RL, 1775 Broadway, New York, NY 10019, USA.

Afghanistan - Voice of Unity (Muslim Mojahedin of Afghanistan): 12.230 at 0130-0215, 122-1255 and 1515-1615; 15.100MHz at 1200-1255; 15.685MHz at 0130-0215, 1200-1255 and 1515-1615; 17.540MHz at 0130-0215 and 1515-1615. Address: Postfach 2605, D-2000 Hamburg 60, Germany.

Angola - A Voz da Resistencia de Galo Negro (Voice of the Resistance of the Black Cockrel) (UNITA). 7.100MHz at 1800-2300; 9.700MHz at 0500-0830; 11.830 at 1100-1400; 15.500MHz occasional tests around 2100. Address: c/o Free Angola Information Service, 1850 'K' St. NW, Suite 350, Washington, DC 20006-2202, USA.

Cambodia - Voice of the National Army of Democratic Kampuchea. 5.407MHz at 0800-0900, 1000-1500 and 2315-0200. Address: First Secretary, Permanent Mission of Democratic Kampuchea to the UN, 747 Third Avenue, 8th Floor, New York, NY 10017, USA. Believed located in China.

Cambodia - Voice of Democratic Kampuchea (Khmer Rouge). 6.025MHz at 1300-1400; 7.350MHz at 2330-0030; 9.440MHz at 1300-1400 and 2330-0030; 11.780 and 11.870MHz at 0900-1100; 15.110 and 17.680MHz at 0400-0500; 15.480MHz at 2330-0030. Address: Same as Voice of the National Army of Democratic Kampuchea.

Cambodia - Voice of the Khmer (Khmer People's National Liberation Front and National Union Front for an Independent, Neutral, Pacific and Co-operative Cambodia). 6.325MHz at 2300-0000, 0430-0700 and 1100-1400. Address: PO Box 22-25, Ramindra Post Office, Bangkok 10220, Thailand.

China - Voice of June 4th (Independent Federation of Chinese Students in the USA) via Broadcasting Corporation of China, Taiwan. 7.150MHz at 0615-0800, 1030-1200, 1530-1830 and 2215-0020; 7.250MHz at 0230-0340, 0615-0800, 1030-1200, 1530-1830 and 2215-0020; 11.905MHz at 0615-0800, 0915-0945, 1030-1200, 1530-1830 and 2215-0020; 15.280MHz at 2100-2200. Address: PO Box 15-7939, Chicago, IL 10017, USA.

Colombia - El Pueblo Responde. 6.315MHz at 0030-0115.

Cuba - Radio Marti. 6.030MHz at 0200-0930; 6.070MHz at 0930-1200; 9.525MHz at 2300-0600; 9.590MHz at 1200-1400 and 11.930MHz at 1400-2300. Address: Radio Marti, 400 - 6th St. SW, Washington, DC 20547, USA.

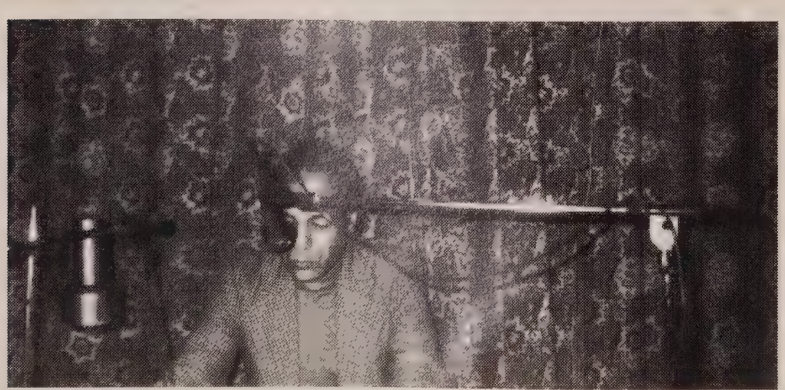
Cuba: La Voz del CID (Cuba Independiente y Democratica). 6.035MHz at 0210-0930; 7.340MHz at 2300-1100; 9.941MHz at 0930-0210; 11.635MHz at 1100-2300. Address: 10000 SW 37th Terrace, Miami, FL 33165, USA.

Cuba: Radio Caiman. 9.965MHz at 1200-1530 and 2300-0400.

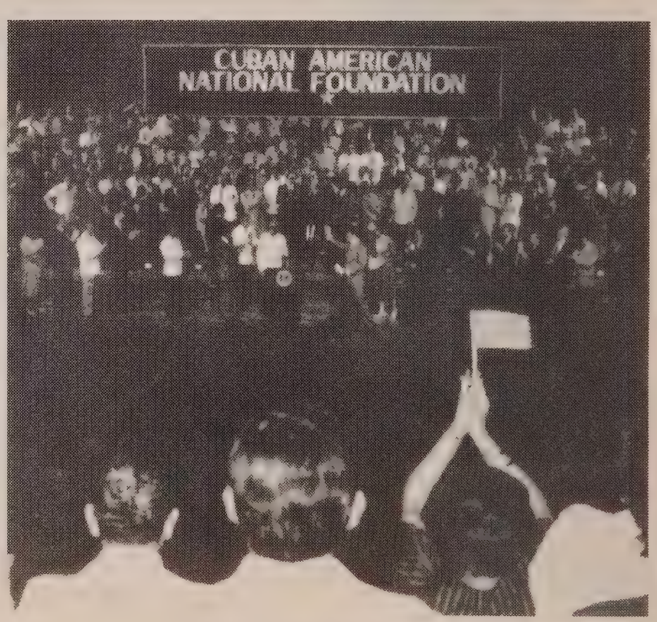
Cuba - La Voz de Alpha 66 (Alpha 66) via WHRI, Indiana. 7.415 and 9.495MHz at 2300-0000; 9.495 and 11.790MHz at 1100-1200. Address: PO Box 420067, Miami, FL 33142, USA.

Cuba - La Voz de Fundacion (Cuban-American National Foundation) via WHRI, Indiana. 7.415 and 9.495MHz at 0100-0200; 9.465 and 11.790MHz at 1300-1400. Address: Cuban American National Foundation, PO Box 440069, Miami, FL 33144, USA.

El Salvador - Radio Venceremos (Farabundo Marti National Liberation Front) 6.700MHz range at 1200-1330, 2300-0330. Address: Cuscatlan Communications, 95 Horatio Street, Room 509, New York,



An announcer at one of the first anti-Afghanistan stations to go on the air after the USSR invasion. Radio Free Kabul operated only on f.m.



Former US President Ronald Reagan is welcomed to a convention of the Cuban American National Foundation, which airs La Voz de Fundacion over WHRI short wave from Indiana.

The Non-Communist Resistance operates Voice of the Khmer.

NY 10012, USA.

El Salvador - Radio Venceremos (FMLN, as previous). 3.500 and 6.300MHz range at 0015-0115, 0200-0315, 1215-1315 and 1830-1915. Address: As Previous. Note: The current status of these two stations is uncertain - there have been no reports of reception recently.

Estonian SSR - Radio Hope, aka Radio Nadezhada (believed operated by Soviet Armed Forces). 12.055MHz at 0430-0600, 1030-1200 and 1630-1800.

Ethiopia - Voice of the Broad Masses of Eritrea (Eritrean People's Liberation Front). 3.712, 3.940, 7.020, 7.485 and 10.020MHz at 0400-0700, 0900-1100 and 1400-1700; 6.944, 7.010, 7.830, 7.890, 9.311, 9.343 and 14.305MHz at 0400-0445 and 1945-2030. Address: National Guidance Department, Sahel Eritrea, PO Box 671, Port Sudan, Sudan.

Ethiopia - Voice of Eritrean Liberation. 5.038 and 6.150MHz at 1500-1600.

Ethiopia - Voice of the Tigre Revolution (Tigre People's Liberation Front). 6.944MHz at 1500-1630; 7.010MHz at 1900-2030; 7.830 and 9.311MHz at 0400-0500, 1500-1630 and 1900-2030; 7.886 and 9.335MHz at 0530-0615 and 1530-1615.

Ethiopia - Voice of Ethiopia on the Path to Democracy (Ethiopian People's Revolutionary Party). 7.01MHz at 0330-0400 and 1430-1500; 9.400MHz at 1430-1500. Address: PO Box 710358, Dallas, TX 75371, USA.

Ethiopia - Voice of the Ethiopian People for Peace, Democracy and Freedom (Ethiopian People's Revolutionary Democratic Front and Ethiopian People's Democratic Movement). 7.880 and 9.335MHz at 0430-0530 (Sunday to 0500); 7.905 and 9.320MHz at 1900-2000 (Sunday to 1930).

Ethiopia - Voice of the Broad Oromo Masses. 7.886 and 9.320MHz at 0400-0430 and 1500-1530MHz.

Ethiopia - Voice of Oromo Liberation (Oromo Liberation Front). 9.540MHz at 1500-1545 and 1900-1945.

Iran - Voice of the Communist Party of Iran. 3.888MHz at 0315-0445, 0430-0600 (Friday) and 1700-1900; 6.410MHz at 0315-0445 and 1700-1900. Address: OIS, Box 50040, S-10405 Stockholm, Sweden.

Iran - Voice of the Iranian Revolution (Iranian Communist Party). 3.888, 4.475, 6.415 and 7.0800MHz at 1430-1530. Address: As Voice of Communist Party shown previously.

Iran - Voice of the Feda'i (Iranian People's Feda'i Guerrillas). 4.107MHz at 1700-1800; 4.160MHz at 0200-0300 and 1600-1700; 6.645 at 0300-0445. Address: ACA, BP 43, F-94120 Fontenay-sous-Bois, France.

Iran - Voice of the Worker (Iranian Revolutionary Worker's Organisation). 4.16MHz at 0300-0530, 1430-1530 and 1730-1830.

Iran - Voice of the Struggle of Iranian Kurdistan. 4.185 and 5.0800MHz at 0330-0430, 0800-0950 and 1530-1620.

Iran - Radio Iran Toilers (Iranian Tudeh Party). 4.775, 6.2300 and 10.870MHz at 0230-0330 and 1530-1830. Address: PO Box 49034, S-10028, Stockholm, Sweden.

Iran - Iran's Flag of Freedom Radio (Front for the Liberation of Iran). 9.045 and 11.620MHz at 0330-0530; 15.100MHz at 0645-0730, 1400-1445 and 1630-1825; 15.565MHz at 0330-0530 and 1630-1825. Address: Postboks 103, DK-2670, Greve Strand, Denmark.

Iran - Voice of the Iraqi People. 7.000MHz at 1400-1445.

Iraq - Voice of Free Iraq (Coalition-run). 9.570, 9.995, 15.600 and 17.960MHz at 1300-0100.

Korea - Voice of National Salvation (Front for Saving the Nation). 3.480MHz at 0200-0700, 1000-1700 and 2000-0100; 4.120MHz at 1000-1700; 4.457 and 6.960MHz at 1000-1700 and 2000-0100.

Korea - Radio Echo of Hope. 3.985MHz at 0900-1200 and 1400-1700; 6.348MHz at 0200-0500.

Laos - Radio of the Government for the Liceration of the Lao Nation. 10.200MHz at 0100-0300 and 0700-0900.

Libya - Voice of the Libyan People (National Front for the Salvation of Libya). 9.450MHz at 1900-2100; 11.825MHz at 0400-0600 and 1600-1800. Address: Al-Inqad, 323 S. Franklin, Box A-246, Chicago, IL 60606-7093, USA.

Libya - Voice of the People aka Voice of the Libyan People's National Movement (Libyan People's National Movement). 9.450MHz at 2200-0000; 11.825MHz at 1800-2000.

Morocco - La Voz de Sahara Libre (Polisario Front) via Radio Algiers. 9.640 and 15.215MHz at 2200-2300. Address: BP 10, El Mouradin, Algiers, Algeria.

Myanmar - (Burma) Voice of the People of Wa State. 5.110MHz at 1130-1330.

Myanmar - Voice of DAB (Democratic Alliance of Burma). 7.137MHz at 0130-0330.

Palestine - Al Quds Radio (Popular Front for the Liberation of Palestine-General Command). 5.990 and 15.050MHz at 0600-1100 and 1300-1700. Address: PO Box 2574, al-Ghubayri, Beirut, Lebanon.

Palestine - Voice of Palestine (Palestine Liberation Organisation) via Radio Algiers. 11.715 and 17.745MHz at 1700-1800. Address: PO Box 411, Luanda, Angola.

Somalia - Radio SM (Somali National Movement). 6.305MHz at 1500-1700.

Sri Lanka - Voice of Eelam (Eelan People's Liberation Front). 7.010MHz at 0230-0330 and 1300-1330.

Sudan - Radio SPLA (Sudan People's Liberation Movement). 9.550 and

1.110MHz at 1100-1200 and 1300-1400.

Yugoslavia - Radio Libertas (Croatian Committee for Human Rights). 9.465 and 21.840MHz at 1600-1700. Address: 1174 Clarkson Road North, Mississauga, Ontario L5J 2W2, Canada.

And that's the lot. Currently, anyway. Remember that all schedules and frequencies can be highly variable. It's safe to say that no-one has ever heard all the clandestine stations in operation at any given time but, with concentrated and persistent listening the average DXer should be able to log many of the stations on this list. Good Hunting!

Clandestine Information Sources

There are several continuing sources of news about clandestine stations. Here are some suggestions.

Clandestine Stations List, published periodically by the Danish Shortwave Clubs International. 7 IRCs from DSCWI, Tavlegar 31, DK-2670, Greve Strand, Denmark.

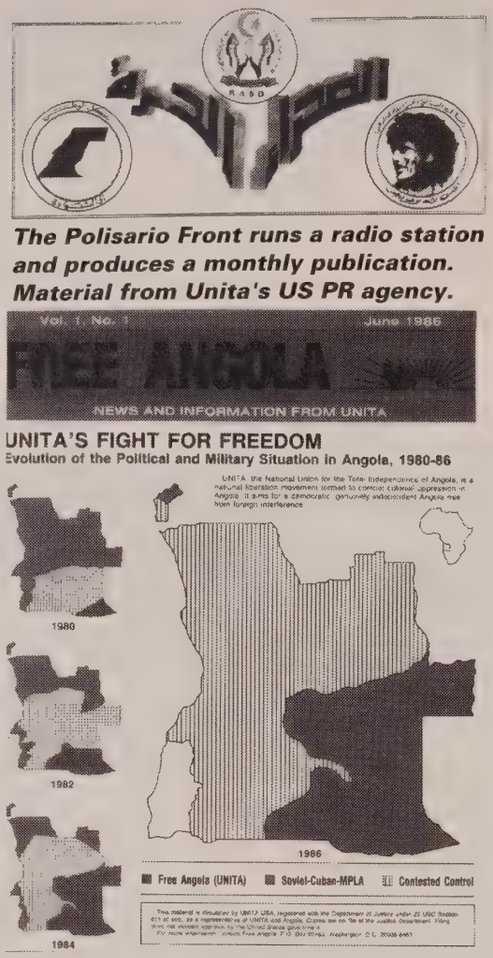
Clandestine Calling, published by Shortwave Press Service, Weender Str 3, D-3400 Gottingen, Germany. Monthly. 24DM, $US17/year.

Clandestine Confidential Newsletter, RR4 Box 110, Lake Geneva, WI 53147, USA. Issued every other month. $US13/year.

*The A*C*E* (Association of Clandestine Enthusiasts). Monthly bulletin that also includes pirate radio, numbers, etc. $US25/year from PO Box 11201, Shawnee Mission, KS 66207-0201, USA.

Clandestine Communique monthly column in *Popular Communications* magazine, 76 North Broadway, Hicksville, NY 11801. Subscription $US24/year (surface mail).

Media Network, the Radio Netherlands DX programme is also recommended for excellent coverage of breaking clandestine broadcasting news. ■



The Polisario Front runs a radio station and produces a monthly publication. Material from Unita's US PR agency.

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Board	Title of Article	Issue	Price £
SR008	Experimental VHF Receiver	Jul 91	5.81
SR007	VLF Receiver	Dec 90	5.24
SR006	Medium Wave AM Radio	Nov 90	3.34
SR005	R210 Converter	July/August	6.87
SR004	PRO-2004 Modifications	Oct 89	6.63
SR003	HF to VHF Converter	Aug 89	5.22
SR002	Weather Satellite Reception	Jun 88	3.88

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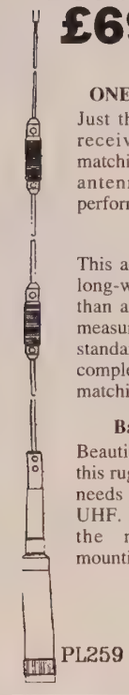

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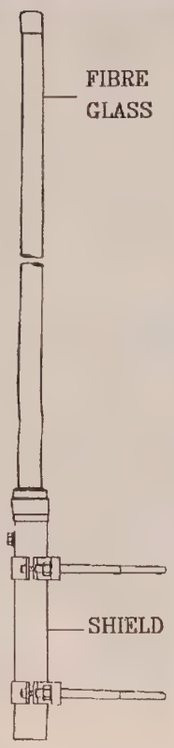

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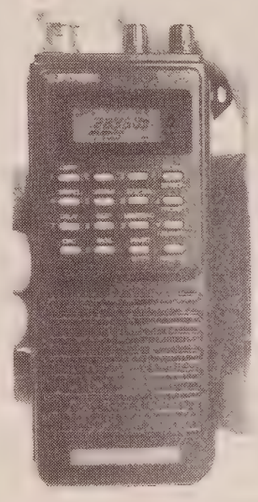

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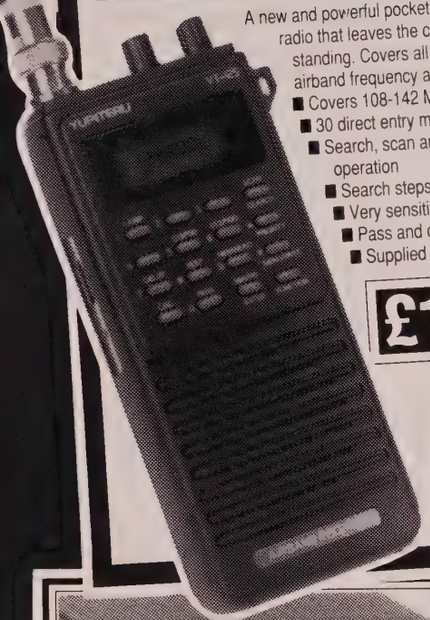

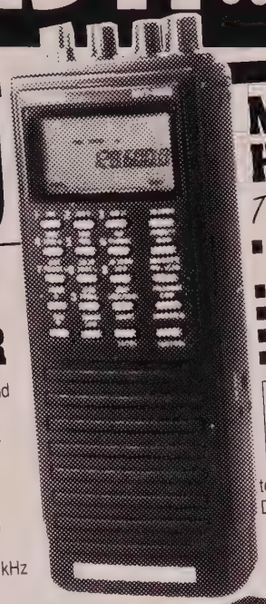

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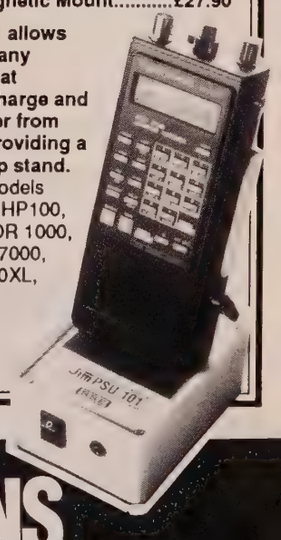

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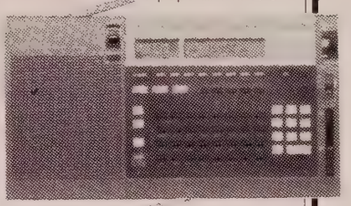

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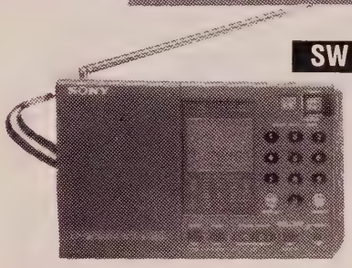

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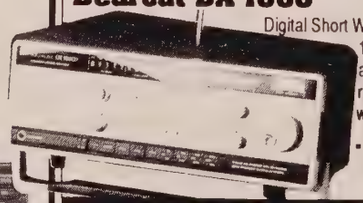

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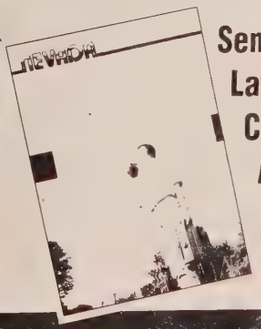

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Control of the AR2002 is via a positive (non membrane) keypad. UP-DOWN frequency change is also available through a conventional rotary tuning control. External computer control is possible through the rear connector, the levels are not RS232 so a small interface is required (available from Garex Electronics).

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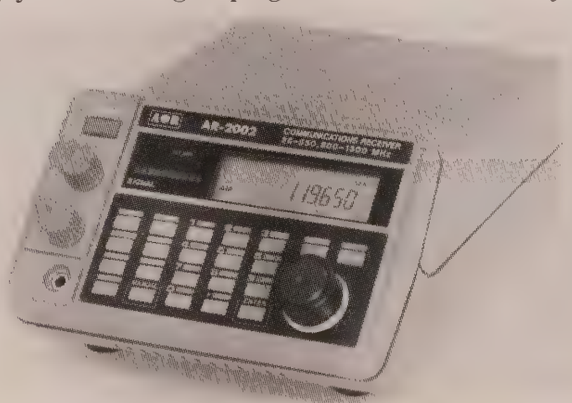

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Switched Attenuators

While re-reading Brian Oddy's 'Starting Out' article on antenna attenuators, Phil Townsend decided that the networks could be built onto a rotary switch without too much effort. So he set about building and trying out various switched attenuators.

Brian Oddy has mentioned that he was not in favour of a potentiometer used as an antenna attentuator, feeling that it could damp down any coil connected to it. As my a.t.u. had a potentiometer attentuator, I was on the look-out for some effective means of replacing it.

Whilst re-reading Brian's 'Starting Out' article in the July '89 *SWM*, I realised that the three attenuator networks he shows could be built on a two-pole, six-way rotary switch, as Cambridge Kits do with the component coils in their a.t.u. kit.

Setting to work, I found making-up a switch with the networks, plus a by-pass position, not difficult, although some neat workmanship was required.

Replacing the potentiometer in the a.t.u. with the switch was no problem, so I began testing it for effectiveness. Almost immediately a problem occured. The effectiveness of the networks was irregular. Selecting the 10dB attenuator provided a satisfying drop of the "S" meter needle, but 15dB returned the needle some of the way, while 20dB restored some of the lost attenuation. A check of the network connections on the switch for short circuits revealed nothing, so, having no other ideas as to the cause of the irregularity, I was very firmly stuck.

Fortunately, a day or two later, I picked up my November '89 copy of *Practical Wireless* and found the answer in S. Niewiadomski's article on 'Passive Attentuator Networks'. I had earthed the attenuator networks to the a.t.u. aluminium box via a solder-tag trapped under the switch. Earthing the networks, as Niewiadomski advises, to the braid of the cable carrying the signal to and from them, corrected the irregular behaviour.

An extended test with the 1980 vintage Lowe SRX 30 communications receiver, found Brian's set of attenuation values to be not quite what I needed for the SRX, so a second switch was made up, still using Brian's 10 and 20dB networks, but adding 5 and 40dB values from the 50Ω section of Table 2 in Niewiadomski's article.

It was with some apprehension that the decision was taken to install this second switch in the SRX, as a replacement for the RF GAIN control. Switching-on the receiver resulted in some alarming noises from the loudspeaker, but they were quickly found to be due to the a.t.u. controls being incorrectly set.

A second extended test, with the first variable switch in the a.t.u. by-passed, left a feeling that attenuation values in between those selected, would be handy, so the a.t.u. switched attentuator values were changed to 5, 10 and 15dB. Installing the two switches has provided a couple of benefits - increased performance from the a.t.u. and an increase in sensitivity of the SRX30. The previously flat 'L' and 'Pi'circuits in the a.t.u. can now be peaked on the l.w. band (via an SEM l.w. to 28MHz converter), while the Parallel and Series circuits have sharper peaks. The increased sensitivity of the SRX is most noticeable on the m.w. band. It is such that, for the first time, a m.w. loop antenna, with its directional properties, is needed to separate those stations on the band that share the same frequency.

Prompted by Brian Oddy, I have been looking out for any effects of r.f. leakage from the switches. Within my limited knowledge and experience of radio, I am not aware of any. Neither switch is positioned close to other components, so perhaps there are none. With the RF Gain control removed from the SRX, the stability of the set came into question, but a check through the receiver's tuning range for any instability revealed none.

Construction

A two-pole, six-way rotary switch is required. I felt it wise to use resistors of 5% or better tolerance for the networks. The switch has a stop-washer and it's as well to check that the washer is correctly placed and then make a note of its position. The poles, lettered on the switch body A & C, are for the input and output of the device. To facilitate connecting up later on, a short piece of insulated wire, about 50mm long, was soldered to each. For the straight-through connection tags 1 & 7 are linked with a very short piece of insulated wire, keeping the wire down on the switch body to save space. The series resistor (R2) of the lowest

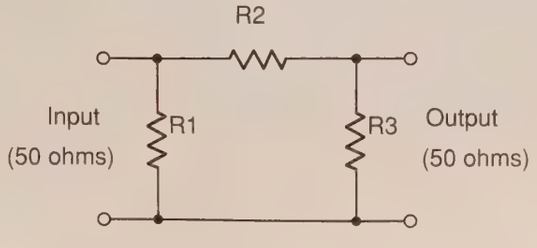

Fig.1: Basic Pi section attenuator. For resistor values see Table 1.

Table 1

Attenuation (dB)	R1 (Ω)	R2 (Ω)	R3 (Ω)
5	180	33	180
10	100	68	100
15	68	140	68
20	62	240	62
40	47	2700	47

Note: these values are only good for 50Ω input and output impedances.

value attentuator was fitted next, using tags 2 & 8. After centralising the resistor's body between the tags, the leads were soldered and any excess cut off. The series resistors of the other attenuator networks, in ascending order, were similarly fitted, care being taken avoid short circuits.

The resistors to chassis or earth (R1, R3) were dealt with by gripping one lead close to the resistor's body with thin-nosed pliers and bending the lead to form right-angle with a not too sharp bend. I began with one of these resistors forming part of the network with the highest attenuation value. The bent lead of the resistor was shortened so that, after soldering to one or the other of the tags carrying the network's series resistor (R2), the earthy resistor's body would be snug and at a tangent to, the switch's ring of solder-tags. Then working in order and away from this resistor, the other earthy resistors were similarly fitted, bearing in mind that the long lead of each resistor would be soldered to the one preceding it, (extending a lead if necessary), thereby forming a loop round the outside of the made-up switch. The long lead of the earthy resistor first fitted, will be the one to be connected to the signal cable braid and so earth all the attenuator networks. Before forming the loop, I checked each network with the multimeter to ascertain that its total resistance was in close agreement with what it should be, each set of resistors being, until connected to the others, in series. This check being satisfactory, the long leads were connected to form the loop. Last, but not least, the completed switch was closely inspected for short circuits.

Each switch needed a minimum space of 40mm diameter by 25mm high. Installation gave no problems, but I did remove the locating pillar so that the switch could be rotated to bring the earthing lead to the most convenient point for connecting to the signal cable braid.

Using the Attenuator

My use of the variable attenuator switch is governed by the SRX 'S' meter needle's desire to spend most of its time in the region over S9. With the a.t.u. and SRX switches in their by-pass positions, the wanted frequency is tuned. Using the receiver's switch, sufficient attenuation is introduced to bring back the 'S' meter needle to below S9. The receiver and a.t.u. controls can now be adjusted for best reception and then sufficient attenuation switched out to enable the signal strength to bury any receiver noise.

For an initial set of attenuator networks, I found Brian's three choices excellent. I would, however, suggest one more of 5dB. To avoid having to make up the 140Ω (R2) resistor in the 15dB network, I substituted one of 150Ω. After some use it will become apparent if other values would be more suitable for your receiver.

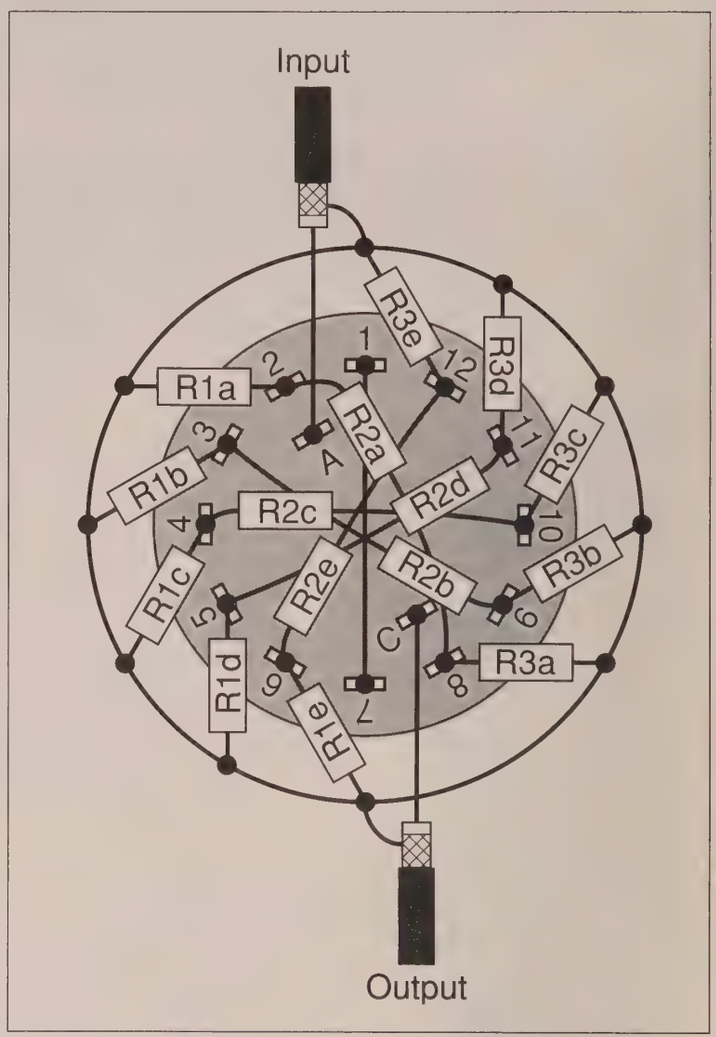

Fig. 2: The resistor positioning and connections for the attenuator switch.

Conclusions

After many hours spent using the SRX 30 and a.t.u. equipped with the attentuator switches, I have had to conclude that the attentuators make tuning the SRX too precise a business to put up with. Accordingly, the switches have been removed and the original potentiometer RF Gain control re-installed. One attentuator switch is now installed in my 'back-up' receiver, a valved Codar CR 70A, Mark 2: where it has proved to be a satisfactory addition.

From my experience a set of attenuators may or may not suit a particular receiver. Therefore, before installing a switch, it should be temporarily connected to check that it will be of benefit. ■

Copies of *Short Wave Magazine* July '89 and *Practical Wireless* November '89 are available from the Editorial Offices price £1.85 each inc. P & P.

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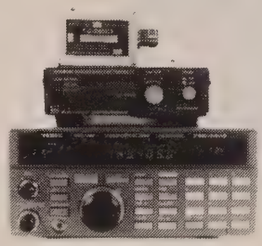

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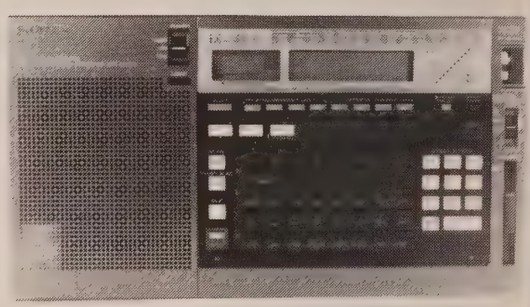

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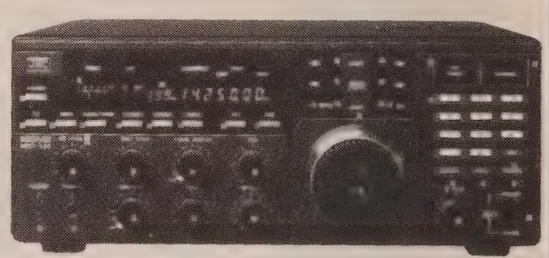

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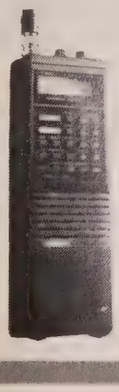
The **HP200E MkII** is a 1000 channel, programmable, handheld scanner. AM, FM and FM wide for commercial channels covering 500kHz-600MHz and 805-1300MHz. Supplied complete with NiCad charger, Antennas, DC cable, shoulder strap, outclip, carry case and earpiece.



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50 Countries on the 144MHz Band

Part 5

Possibly the most esoteric form of v.h.f. propagation has been left to the last part of this series. P.E.W. Allely GW3KJW lets us into the secrets of communications via the earth's original satellite, the moon.

Early radar experiments showed that signals sent from earth were being reflected back to earth by the moon - albeit with an enormous loss in signal strength. Radio amateurs were, as usual, quick to exploit this new means of v.h.f. propagation. As far back as 1953, successful two-way contacts were made via the moon on 144MHz. Since then, this form of propagation has proved to be reliable on even higher frequencies.

Basically a signal from earth is deliberately squirted out into space, strikes the moon and is reflected at a tangent to some other place on earth. It sounds simple, but I can assure you that it is anything but simple. The moon is close by solar standards, but still too far away in everyday distances. It is an average of 384 000km away and there is a vast loss in wave energy over this distance to start with. Additionally, the moon is not a good reflector of radio signals - most of the radio energy reaching the moon is absorbed, leaving approximately 7% to be reflected or deflected elsewhere. Then the remaining energy has to travel the 384 000km back to earth.

There is a loss of about 380dB on an earth-moon-earth (e.m.e.) path, so an inordinately large amount of e.r.p. has to be generated to overcome this loss. This entails the construction of high gain antennas, typically in the order of 25dBd gain, and high power. The DTI will, on being satisfied that you are genuinely going to be attempting e.m.e. experiments, issue a special licence authorising the use of high power, it is possible that the normal legal limit of 400W at the antenna may suffice if the antenna gain is sufficient.

Difficult Target

Now, with a big antenna system and high power, the problems do not decrease, the moon, seemingly big to young lovers and poets, is actually quite small, a mere 3476km in diameter and its average distance takes up only 0.5° of the celestial orb. It is now obvious that it is a difficult target to locate accurately without recourse to lunar orbit data, and of course it is moving, orbiting around us whilst we are orbiting the sun and also spinning on our own axis. When the feeling of giddiness passes it will be realised that the antenna must not only need to be pointed at the moon, but will need to have azimuth and elevation control in order to remain firing to the right direction, and as the beam width of a high gain antenna is quite narrow, this control must be accurate or the signal will miss the moon entirely. Due to the spinning effects, the signal is better if the antenna is circularly polarised, and the reflected signal is in the opposite polarisation - the problems mount.

Earth-moon-earth propagation is only possible when the moon is above the horizon, but when everything is right, distances of more than 15 000km can be achieved, not counting the path to the moon and back. The fact that you may only see part of the moon illuminated does not matter. A narrow crescent moon suspended in the sky does not mean that only the part you can see is there - believe me, it's still complete, just not illuminated. Remember also that the moon is visible during the daylight hours as well. In fact, some of the prime times for e.m.e. communication are in the mornings when the moon is 30° high in the western sky, providing the correct angles for signals sent from Europe to reflect at a tangent to the Americas.

Although sideband can be used, the major mode of transmission is Morse. Most contacts are pre-arranged after consultation of lunar charts or computer data, and a careful check at the low end of the 144MHz band may give you some indication that some one is trying this system of communication. You may find very loud Morse signals around 144.010MHz either calling CQ or calling some exotic long distance amateur say in the United States. If you do not possess an antenna system comparable with Jodrell Bank, and a receiver with a signal to noise ratio that only advertising blurb can equal, the chances of hearing anything from the New World is remote, but not impossible. However, it is a form of communication worth monitoring, I once heard part of the callsign of a W5 for a fraction of a second and have never forgotten it. I have nothing but admiration for that dedicated small group of enthusiasts who have perfected their skills in achieving such outstanding contacts.

Delight

There we have it, five forms of propagation on 144MHz. There are others, variations of these five, but a slight understanding of the basic forms will, I am sure, allow the listener a surer chance of hearing long distance signals on this band. Propagation on the v.h.f. bands, although reasonably well understood, still holds a deal of delight to the keen listener. An extended tropo duct opening may allow you to hear 15 different countries within a few hours. A big auroral event and you may hear 20 different countries. Sporadic E will spring surprises with signals possibly from North Africa coming in at loud signal strength, or the band filled to overflowing with Romanians and Greeks. Occasionally there is a mix of propagation modes when unaccountably 144MHz decides to throw even bigger treats. I remember one day in June 1989 when there was a strong aurora in the afternoon and early evening, followed incredibly by a Sporadic-E opening in the late evening and another time during the Persieds meteor shower in August, when an extended tropo opening

meant that many contacts made with difficulty on meteor scatter were repeated with ease a few hours later.

Other Disciplines

It will be seen that listening for the rare signals on v.h.f. is not merely a matter of switching on and sitting back - the interesting study of astronomy and meteorology becomes mandatory.

One of the facets of our hobby is that it leads to an understanding of other disciplines, opening up new and fascinating lines of study. I have experienced many years of happy listening on the v.h.f. bands, and many hours of intense frustration having completely failed to hear that elusive country. Still they all come in time and, as I have tried to explain, luck does not always work, you are listening because you have correctly forecast that such an opening may occur.

The discerning listener will obviously want to get the most out of his receiver, so I would recommend that, no matter how good your receiver is, performance will be vastly improved by installing an antenna as high and as much in the clear as possible.

A 9-element Yagi is not very big at 144MHz and no more obtrusive than a Band II f.m. antenna. It should be capable of being rotated though 360°, and ideally should be connected via good quality low-loss connectors, and equally low-loss coaxial cable. If finances permit, the addition of a GaAsf.e.t. masthead pre-amplifier will make all the difference between hearing a faint signal and just hearing noise.

Finally, remember that your antenna is better horizontally polarised. I wish you success in listening and you may hear those fifty different countries on the 144MHz band. ■

Abbreviations

e.m.e	earth-moon-earth
MHz	megahertz
km	kilometres
dB	decibels
dBd	decibels referenced to a dipole
e.r.p.	effective radiated power
DTI	Department of Trade & Industry
W	watts
CQ	general call
v.h.f.	very high frequency
f.m.	frequency modulation

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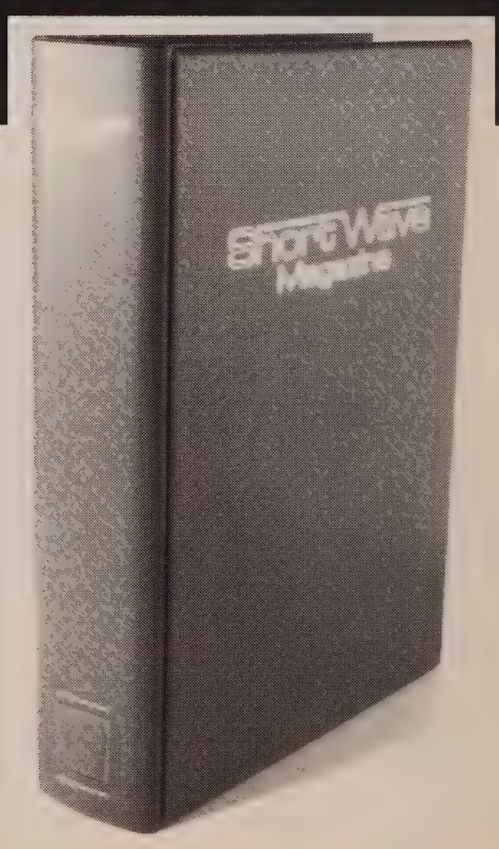

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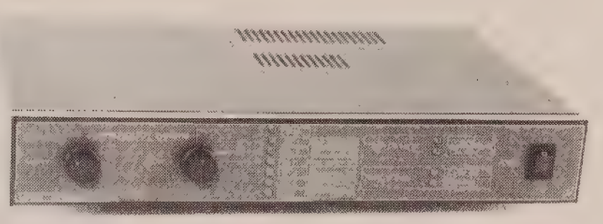

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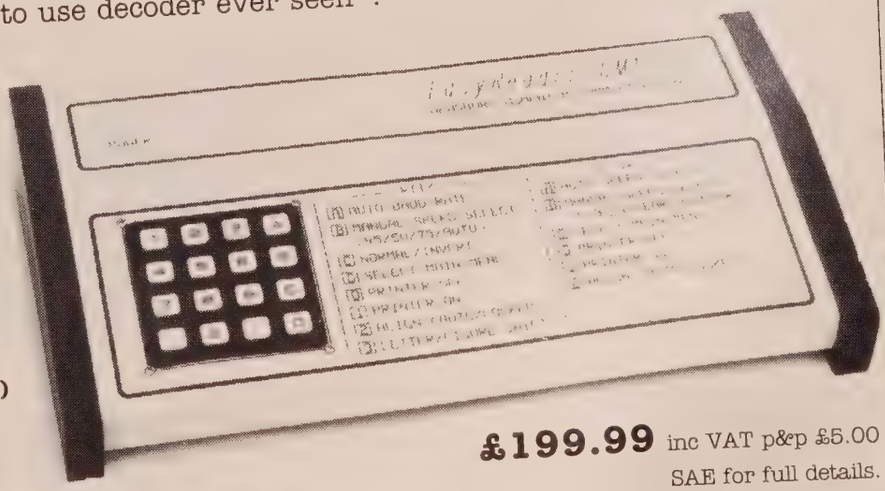

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The R-2000 From Kenwood

The R-2000 fitted into the middle of the Kenwood receiver range between the R-600 and the R-5000. Sadly the R-600 is no longer with us - "Gone, gone and called me Mother"; but the R-2000 goes on from strength to strength because of its unique appeal to a wide-ranging section of the listening fraternity.

The R-2000 is the receiver that bridges the difficult gap between the user who wants to listen to world-wide broadcasts from the comfort of his armchair and the keen listener who likes to hear aircraft on HF SSB across the Atlantic; or perhaps CW from the other side of the world. The R-2000 can truly be said to satisfy the listening needs of almost everyone.

Kenwood have always excelled at making complex equipment easy to use, so the control layout is logical and self-explanatory. If you want to tune the receiver, turn the knob. If you want to tune slowly, press the button marked 'Slow'. If you want to get somewhere in a hurry, press the 'Fast' button. Do you want to change mode? Simply select, using the soft touch buttons. Recall something from memory? Touch the appropriate button. Scan the memories? Press M.SCAN. And so it goes on, displaying Kenwood's design skills which have come from listening to the users and giving you what you need.

The R-2000 covers 150kHz to 30MHz and receives SSB, CW, AM and FM. There is also an optional internal VHF converter to extend the receiver's coverage to include 118MHz to 174 MHz; again with all mode reception. This makes the R-2000 an extremely comprehensive listening tool, particularly for the keen aircraft listener because you can follow aircraft progress on VHF during take-off and climb, and then continue to listen on HF SSB when the flight is handed on to Oceanic Control.

I still get a kick from hearing 'Speedbird Concorde' telling control that they are flying at some incredible altitude, at equally impressive speed and with an outside air temperature guaranteed to bring tears to the eyes of the proverbial brass monkey.

The size of the speaker in the R-2000 is evident from the photograph and Kenwood's involvement in the high quality sound equipment field certainly shows in the audible results. The audible quality from the R-2000 is very good indeed and worthy of recording - for which purpose you have a tape recorder jack and a built-in digital timer which not only switches on the R-2000 but will control the switching of the external tape recorder. Just the thing if you want the latest American football results but you also need to be in bed at the same time.

The hobby of short wave listening really began in this country as, indeed, did broadcasting itself. As a result, the UK listener has a long tradition of being able to get the best from the "all pervading luminiferous ether" (to quote a 1920's publication). The R-2000 brings modern technology to those skilled listeners and enables them to get the most from the hobby.

The best thing to do is to visit one of our Regional Centres and give this lovely receiver a good workout; but if you are unable to do that a detailed leaflet is available on request. Better still, enclose four 1st class stamps for our 'Listener's Guide' (see opposite page) and request full details on the R-2000.

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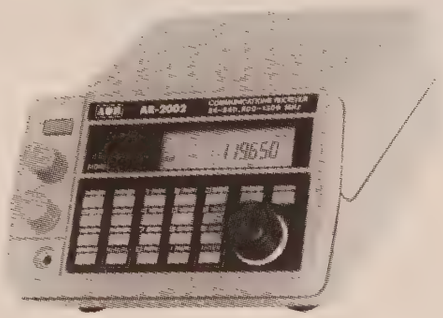

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2LO is calling again

Jack Hum G5UM traces the history of a famous callsign

Back in the mists of radio time - and that means approximately the first dozen or so years of the present century - there existed in the British Isles a few Hundred 'wireless enthusiasts' who talked among themselves almost entirely by Morse code with spark transmitters and four-figure wavelengths. Note 'wireless' and 'wavelengths' - the words radio and frequencies were many years into the future. They used three-letter callsigns, often self-allocated.

When peace broke out in 1918 and Amateur Wireless Permits were available once again, the transmitting enthusiasts were faced with some startling changes. For one thing, the callsign structure as they had known it was no more: the new post-war callsigns were to consist of numeral plus two letters. For another thing, an esoteric device called a thermionic valve had appeared - and esoteric it remained for several years for the very good reason that most domestic receivers did not use it. It was too costly. In the hard years post-WWI the burgeoning horde of broadcast listeners used crystal detector receivers.

Learning Thermionics

Thus the British 'wireless experimenter' found himself obliged to become *au fait* with this revolutionary technical development, the more particularly because in the Transmitting Permit issued to him - still condescendingly 'Permit', not Licence - it was emphasised that the use of spark was expressly forbidden. These experimenters took valves into their stride just as today's enthusiasts master microwaves and microcircuits with seemingly little effort.

Much could be unfolded about the onset of valve technology, but that must be a story to be told another time. Our present remit is to tell how the new callsign structure came into existence and to look particularly at one of the most famous of them - 2LO. It belonged to the London station of the British Broadcasting Company (the BBC became a corporation five years later) and 'LO' came to be synonymous with London. It was one of many self-evident callsigns which the licensing authority of the time were in the habit of issuing (the licensing authority was the GPO, which then had a monopoly of electrical communications within these islands). A self-evident callsign was one which could be related phonologically to its holder's name and 2LO was one of them.

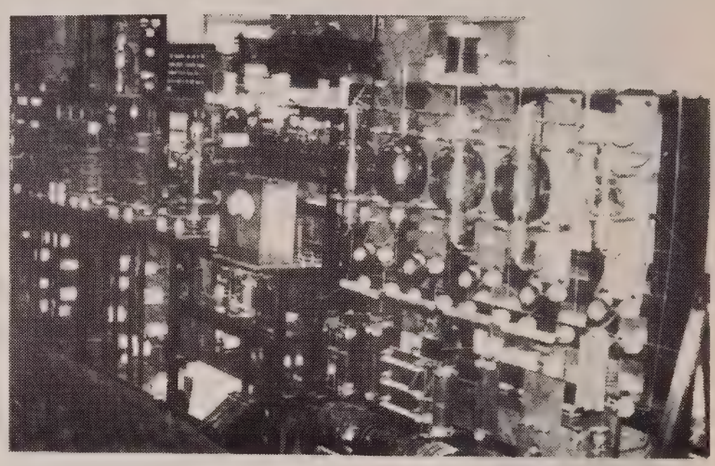
'But wasn't 2LO an amateur callsign?' the reader may well ask. Answer: it was at that time an amateur-sounding one but professionally used. The GPO's habit in the 1920s was to issue figure plus two letter callsigns to amateur and professional alike. A callsign list of the period shows 2LO sandwiched between two wireless experimenters, 2LN in Lancashire, and 2LP in south London.

Precursor to 2LO was another amateur-sounding callsign, 2MT. It belonged to a Marconi experimental station at Writtle in Essex, and its callsign could be transliterated as Marconi Telegraph (MT). Its purpose was to give the burgeoning body of wireless enthusiasts something to listen to. Its characterful prime-mover was Captain P.P. Eckersley, an entertainment in himself, who was later to become Chief Engineer of the infant BBC.

Neither 2MT nor 2LO was alone inthe quasi-amateur commercial callsigns of the 1920s. Others included 2AA of the Radio Communications Company in Slough, 5AA held by the Leicester Mercury, 2KH of the Ashley Wireless Telephone Company at Liverpool. Even the London & North Western Railway at Crewe made sure it got a callsign.

It is more than likely that many of the amateur type callsigns issued to commercial companies were applied for in the hope that their holders would be allowed to undertake broadcasting. This had come about in the United States. There virtually any undertaking prepared to provide programmes over the air could do so. At that time there were already hundreds of them in The States.

Not so in Britain. One organisation, the BBC (still a company like the other callsign holders) was charged with the duty to provide broadcast programmes for the populace. Not many hours a week to start with, but gathering more air time as the decade progressed.



Since the G2LO callsign appeared in the Callbook it has been transferred to the BBC Engineering Transmission Department at Warwick. There is a new QSL card to go with the move showing the original '2LO' London transmitter, operated by the BBC from 1922 to 1925.

Flagship

Its flagship was '2LO, the London station of the British Broadcasting Company', operating from its headquarters in Savoy Hill, a narrow street stretching from London's river uphill to The Strand. This new miracle of communication, as it was perceived at the time, earned hundreds of column inches inthe newspapers of the period, truly a newsworthy and headline grabbing development.

At 2LO a modest transmitter feeding an antenna on the roof of 2 Savoy Hill was supplanted, before long, by a much more ambitious array on the roof of Selfridge's famous store in Oxford Street. It was good publicity for Selfridge's, as it was one of the sights of London to a 'wireless mad' public.

Its coverage was little more than the Greater London metropolitan area. The populace at large, enthused by what it read in the newspapers, wanted a share in 'this modern miracle'. To meet the demand the BBC set in train an engineering project to provide what were to be called Main Stations in the kingdom's larger cities. Many of these were once again allocated self-evident callsigns. Glasgow's 5SC could, with a little imagination, be deemed to have a Scottish burr. And where could 5WA be sited except in Wales (covering Cardiff, but not much signal up the valleys and beyond)? Newcastle was 5NO, but there seemed less 'self-evidence' about 2ZY for Manchester or 5IT for Birmingham.

Service areas, even of these 'main stations', were restricted. Soon, relay stations were established to fill in the gaps as far as the techniques of the time permitted - and many of the gaps remained quite extensive. The relays - a few hundred watts by contrast with the Main Stations with their kilowatt or two - did not

originate programmes: they relayed what was offeed to them via GPO landline from the main broadcasting centres. They too were allocated self-evident callsigns: 6FL was Sheffield, 6BM Bournemouth and 2EH Edinburgh, to name but three.

When 'the Beeb' became a Corporation in 1927 most of its callsigns were reallocated to amateurs. Appropriately, Glasgow's 5SC went to a radio amateur in Dundee. Sheffields 6FL went to a distinguished television designer of later years. Some of the ex-BBC callsigns changed hands several times within the transmitting amateur fraternity. But not the most famous of them all, 2LO.

Resurgence

To the generality of British radio amateurs accustomed to talking with stations using numeral plus three letter callsigns, the holders of numeral plus two letter callsigns appear to them as relics of another age. Not always is this true: at least two of the two-letter callsigns inthe current lists belonged originally to the holders' grandfathers. Many examples occur of the handing on of the callsigns of beloved but deceased radio men to their local clubs. At Cambridge G2XV is one. Another is G2NM whose licensee, the late Gerald Marcuse, confounded the sceptical pundits of the 1920s by demonstrating, entirely at his own expense, that Empire broadcasting on short wave was practical. His callsign's continuity is maintained by the Chichester Radio Club, his memory by a plaque on a seat in the churchyard of his south coast home.

When G2LO (the G prefix now mandatory, unlike before the war) appeared on the bands almost simultaneously with G2MT, operators writing them into logs must have thought that these were, well, just relics. Not so the older generation of radio amateurs. To them history, in repeating itself with the advent of G2LO and G2MT, brought incredulous amazement. 'Could those famous callsigns **really** be around once again?'. They were indeed! Each was reactivated by a club, G2LO by the Ariel Radio Club, open to BBC employees and G2MT by the Marconi Radio Society.

Appropriately, G2LO was allocated to the Ariel Club's unit at Brookmans Park in Hertfordshire. Here, 55 years earlier, the first ever twin-transmitter installation had been pioneered by the BBC. Its purpose was to make two alternative programmes available to listeners so as to offer a choice not available from the single transmitters in the larger cities. Over the next few years the twin-transmitter service was extended to provide a choice of programmes to much of the population.

A decade before 2LO was resuscitated another memorable callsign made its debut in an amateur context. Daventry was the home of the BBC's original G5XX long-wave transmitter of 1925, known nationwide as 'Five XX'. Today's G5XX is another Arield Club callsign. When a 430MHz amateur repeater was established nearby, what better callsign to give it than GB3XX!

Both G2LO and G2MT appeared for the first time in the 1984 RSGB *Callbook*, allaying fears that they had been pinched by pirates! These fears were finally dispelled when QSL cards bearing the hallowed callsigns began to filter through to those operators who had contacted them.

The moral of this tale is: Never treat a two-letter callsign with suspicion. If you hear or work one, identify it in the *Callbook*. You may discover that you are communicating with part of the history of amateur radio. ■

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NRD-535 Communications Receiver

The NRD-535, reviewed here by Mike Richards G4WNC, is the latest from the prestigious JRC range of receivers.

The NRD range of communications receivers from the Japan Radio Corporation (JRC) has established a formidable reputation among short wave listeners. For most, these receivers represent the ultimate in receiver quality. Because of this, any new model must attract more than just a passing interest. Along with its predecessors, the NRD-535 features continuous coverage from 100kHz through to 30MHz. In its basic trim it's also able to resolve all the main modes e.g. s.s.b., c.w., a.m., f.m., RTTY and FAX. This model also includes an RS-232C interface that allows all the main receiver functions to be controlled remotely by a personal computer. So let's look a little deeper to see just what you get for your money.

Instruction Manual

A good instruction manual is essential with a receiver of this level of sophistication, and the supplied unit comprised some 56, A4, pages The manual followed standard practice by using plenty of illustrations to help clarify the more complex points. I was pleased to see that also included was a full description of the remote control commands. There was sufficient information for even a modest computer buff to be able to generate their own programs.

The final sections of the manual were devoted to installing optional units and general maintenance. For completeness, this section included a full set of circuit diagrams, though the print size was obviously very small.

My only complaint with the manual was the quality of the English translation. Some sections were particularly obscure. How about "When entering 0 for the display shift mode, the displayed frequency may vary, while the Receiver keeps a signal existing in the centre of the receiving band, once caught, without escaping it, even if the SSB mode is changed." I really think the translation quality could be improved. This is particularly important for the descriptions of the more complex features.

Ins and Outs

The NRD-535 boasts a wide range of external connections designed to satisfy the needs of the specialist listener. Let's start with the power options. In it's basic form, the NRD-535 can be operated either from a.c. mains or an external d.c. power source. The standard mains unit is housed inside the receiver and can be set for 100/120V or 220/240V at 50 or 60Hz. The tolerance on these voltages is ±10%, so the NRD-535 can effectively handle supplies between 90-132V and 198-264V. This should cope with all the common supply voltages.

The d.c. supply option is primarily designed to take the standard vehicle voltage of 13.8V. However, it can operate between 12 and 16V, so is quite flexible.

There were two options for connecting the antenna. Low impedance coaxial-fed antennas are connected to a standard SO-239 socket on the rear panel, while high impedance wire antennas were connected via a pair of terminals.

An external speaker socket was provided, but instead of the common 3.5mm jack, a phono socket was used. However, this was a switched type that disconnected the internal speaker when a plug was inserted. Keeping with the audio side, there was a very handy line output that provided 0dBm into 600Ω. This output was duplicated on the front panel as a 3.5mm RECORD jack. As this feed was taken from before the volume control it enabled recordings to be made with the volume turned down. However, it's important to note that the two line outputs were connected in parallel so external devices may interact. Other than the obvious use of making recordings, these outputs are invaluable for connecting auxiliary decoding units or audio processors. The final audio output is the headphone jack on the front panel. This will drive 4-16Ω units, including stereo headphones.

For those wishing to connect auxiliary equipment there was an external power socket. The only problem was that the output current was restricted to approximately 30mA. This somewhat limits its usefulness.

Other external connections included scan hold, timer, mute and RTTY mark and space - more about these later. Finally, there was a 25-way D-type connector for the RS-232C computer interface.

Operation

One of the notable features of the NRD range of receivers is the very business like layout of the front panel. Despite a comprehensive range of features careful design has ensured that each control is well placed. The main display features a fluorescent unit that gives clear visibility under all lighting conditions. This display includes a very detailed S-meter in addition to the main frequency and channel read-outs. The top section of the display supplied supplementary information such as receive mode, filter data and a number of other options.

Probably the most used control of any communications receiver is the main tuning control. It is therefore very important that this should be well placed and feel good. The NRD-535's tuning knob meets both these requirements admirably. There's plenty of room around the knob and it has a silky-smooth feel. As with most modern receivers, the frequency changed in steps rather than continuously. However, the 1Hz (yes 1Hz) tuning steps mean that the NRD-535's control is about as near to truly continuous as you can get! For times when a faster tuning rate is required, these steps could quickly be set to either 10 or 100Hz. An alternative means of tuning was to use the < and > buttons that were located immediately above the tuning control. Personally I did not find these to be particularly useful, they were mainly of use when changing operating parameters.

For rapid frequency changes or when selecting a specific station the direct entry mode was excellent. Using this option, the required frequency was typed in on the numeric keypad.

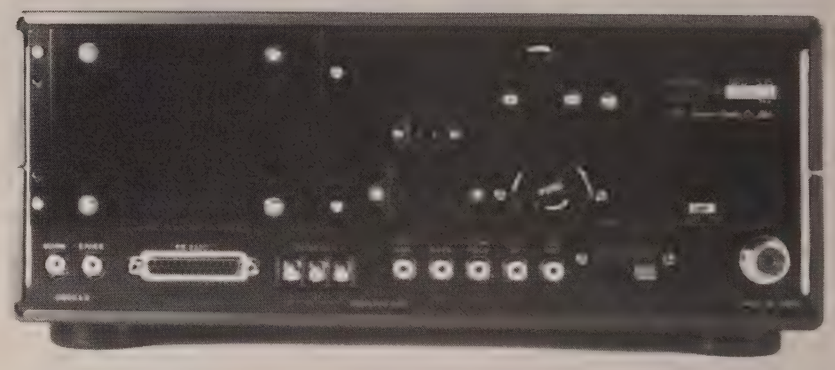
One of benefits of a processor controlled receiver is the ease with which memory channels can be implemented. The NRD-535 boasts a total of 200 user-programmable memories. Each of these can store not only the frequency but receive mode and filter settings even down to the current a.g.c. rate. This adds considerably to the user friendly feel of this receiver. Moving between your favourite frequencies can be achieved with just a couple of key presses.

Closely associated with the memories are the scanning options. These enable automatic monitoring of the memories. The scanning facilities provided on the NRD-535 are not as comprehensive as can be found on a modern v.h.f/u.h.f. scanner, but are nevertheless very useful. The main feature of the scan is its ability to operate between any two channels monitoring all the intermediate channels. By keeping all associated frequencies together you can increase the effectiveness of the scan. As an example, if you stored all your favourite marine s.s.b. frequencies in consecutive memories you could set the scan to monitor just these memories, so giving a simple overview of that mode.

Storing & Scanning

Storing frequencies in the memory was very straightforward, though you did have to type in the frequency using the numeric keypad as it wasn't possible to transfer a frequency direct from the display to memory. To use the scan effectively you need to first set the squelch control to mute the inter-station noise. Once this has been done the scan will stop on any channel that has a signal that exceeds the squelch threshold. The speed of the scan is another important aspect and can be adjusted by the user between 0.5s/scan and to 5s/chan. This should cope adequately with all normal requirements. Another useful feature was the option to pause the scan at any point with a single key press. This is particularly handy if you want to continue monitoring an interesting station. One final point with the memories was the provision of a lithium battery to ensure that the memory contents were maintained while the main receiver was powered down. The battery was accessible from the rear panel and was estimated to have a life of about five years.

In addition to the basic scan functions, the NRD-535 featured a sweep facility. This enabled the operator to initiate a sweep between any two frequencies. The steps used for the sweep aligned with that available for the main tuning control, i.e. 1Hz, 10Hz or 100Hz. As with the scan option, the sweep speed could

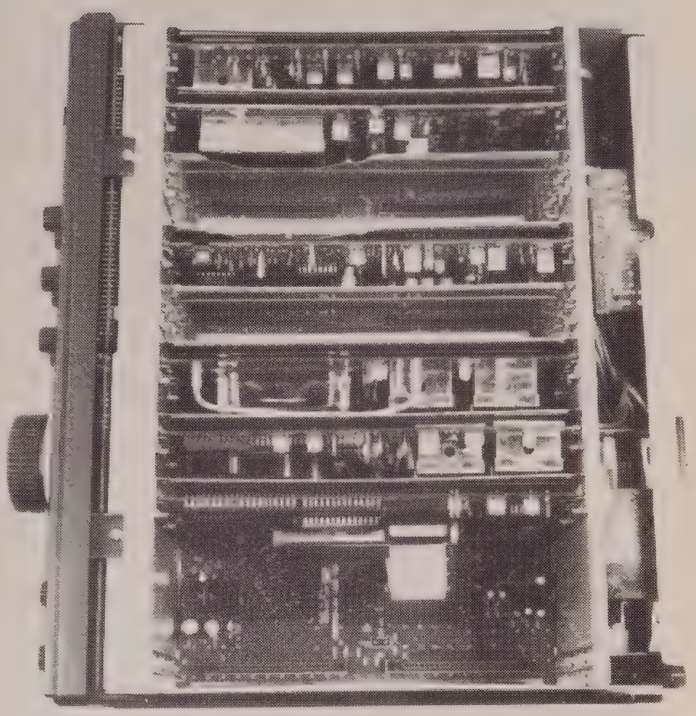


be adjusted over a wide range which in this case was 0.05s/step to 0.5s/step. The sweep option was particularly useful for monitoring normally quiet bands for activity.

Multi-mode Reception

One of the many areas where the NRD-535 can be seen to be different from many other communications receivers is in the number of receive modes that are supplied as standard. In addition to the conventional s.s.b. and c.w. it features a.m., f.m. FAX and RTTY. You may well be asking what's the difference between s.s.b., FAX and RTTY as far as the receiver is concerned. Well, it's all to do with the frequency range of the demodulated audio. For s.s.b. reception the displayed (carrier) frequency is required to produce a zero beat. However, for FAX reception the displayed frequency needs to create a 1900Hz audio tone. When resolving RTTY the same applies but a 2100Hz. audio tone is needed Producing these different tones with the same displayed frequency is achieved by automatic adjustment of the local oscillator. The prime advantage of the system used in the NRD-535 is that the received signal is always kept in the centre of the i.f. passband. This enables the operator to make best use of any auxiliary filters. If you attempt to receive a high tone RTTY signal on a receiver without this system you'll actually be receiving right on the edge of the filter bandwidth. In some cases you may even find that one tone falls outside the i.f. passband causing considerable degradation in the received signal.

As you would expect from a receiver of this quality, there were a number of features included to assist with the processing of received signals. Probably one of the most important are those associated with the i.f. bandwidth. In its basic form the NRD-535 featured three bandwidths: 2kHz, 6kHz and 12kHz. These were directly linked to the receive mode, but the operator had the option to vary this using the < > buttons on the front panel. For those of you with more demanding requirements, optional filters could be fitted in the narrow or auxiliary positions on the filter board. The filters available from NRD included the following bandwidths: 300Hz, 500Hz, 1kHz, 1.8kHz & 2.4kHz. For further processing of the signal at i.f., a Pass Band Shift control was provided. This enables the operator to effectively shift the i.f. passband by up to 1kHz with respect the received signal. This helps to reduce problems caused by adjacent channel interference. Another common problem experienced on the h.f. bands is heterodyne interference from a signal within the required passband. This can be tackled by using the i.f. notch filter. This gives a 40dB notch that can be adjusted across the i.f. passband. The next processing tool was a very flexible i.f. noise blanker. In addition to having a continuously variable threshold, the blanker characteristic could be switched to cope with either simple pulse interference or the more complex type associated with the Woodpecker.



A view inside the NRD-535 showing how much has been fitted into the receiver.

Technical Overview

I thought it would be interesting to give a brief view of how the NRD-535 handles signal processing.

One of the key areas with any high-quality receiver is the front end filtering - the object being to eliminate all but the wanted signal. The NRD-535 uses a 35MHz low pass filter followed by a diode-switched, seven-band tuner that feeds the first mixer via a second 35MHz low-pass filter and r.f. amplifier. This first section features excellent filtering and helps minimise the risk of spurious responses from later stages The first i.f. of 70.455MHz is amplified and passed to the second mixer to produce the 455kHz second i.f. It's at this second i.f that the main i.f. filtering and signal processing takes place. For all but f.m. demodulation a final i.f. of 98kHz is created before demodulation. It's at this final i.f. that the a.g.c. control voltage is generated. Advanced synthesiser techniques are used to supply the local oscillator feeds. One notable point was that the design was clearly designed around achieving best performance. As a result discrete components have been used in preference to integrated circuits for many of the critical r.f. signal processing circuits. A typical example of this is to be found in the i.f. amplifier where dual gate m.o.s.f.e.t.s are used in preference to an integrated circuit alternative.

Optional Extras

Although the NRD-535 reviewed was the basic specification model, I think it's appropriate to take a look at the range of options that are available.

The first of these is the BWC (Bandwidth Control) which gives the listener a very powerful tool. The facility is controlled via a knob on the front panel and gives continuous adjustment of the receive bandwidth. The adjustment range is from 2.4kHz down to 500Hz so should prove extremely versatile.

For those interested in a.m. broadcast reception the ECSS (Exalted Carrier Selectable Sideband) will prove very useful. This enables the operator to resolve either of the two sidebands transmitted by an a.m. station. The benefit of this system comes when the wanted signal is suffering adjacent channel interference. This type of interference can be greatly reduced by selection of the appropriate sideband.

The utility enthusiast is served by the CMH-530 RTTY demodulator. This can decode standard ITA No. 2 transmissions using shifts of 170, 425 and 850Hz with baud rates between 37 and 75 baud. The decoded signal is available for display on a computer or dumb terminal via the RS232C connector on the rear panel.

Although the stability of the basic receiver is excellent, NRD offer an optional ovened oscillator. This guarantees a frequency stability of ±0.5p.p.m. over the temperature range -20 to +50°C and should satisfy the most demanding requirements.

Performance

In the case of this receiver, I've made an exception to my review process and have not carried out full technical tests. The reason is simply that the excellent performance of this receiver has been clearly established by other technical journalists and users alike. Because of this, I limited the technical evaluation to a few spot tests to confirm that the review model was performing within specification. Needless to say it passed these tests with no problems.

From the operators point of view, I found the layout of the controls to be excellent. With my personal interest in utility decoding, I was particularly impressed with the frequency stability of the NRD-535. This aspect is particularly important when receiving FAX images as each image can take up to 15 minutes. For this reason, it's useful if the receiver can be left unattended to receive a number of consecutive charts. An even more demanding case exists if you utilise the NRD-535's internal timer to trigger unattended FAX reception. The NRD-535 performed exceptionally well in these conditions and was well within the demanding requirements of FAX reception.

One of the comments often made by those using a high quality receiver for the first time is the apparent quietness of the bands. This is because they are used to hearing lots of spurious signals found in many poor quality receivers. Excellent front-end selectivity, combined with top quality mixers, means that in the 535 spurious responses are kept to an absolute minimum.

Specifications

Frequency	100kHz - 30MHz
Modes	RTTY, c.w., s.s.b., a.m., f.m. & FAX
Stability	±10p.p.m. after 5 minutes ±2p.p.m. after 1 hour.
Frequency step	1Hz minimum
Memories	200
Receiving system	Triple superhet
IFs	70.455MHz, 455kHz and 97kHz
Sensitivity	100-500kHz 14dBμ (24dBμ a.m.) 0.5-1.6MHz 6dBμ (16dBμ a.m.) 1.6-30MHz -10dBμ (6dBμ a.m., -6dBμ f.m.) All 10dB s/n (12dB SINAD for f.m.)
Selectivity	AUX 12kHz (6dB) WIDE 6kHz (6dB) 15kHz (60dB) INTER 2kHz (6dB) 6kHz (60dB) NARR 1kHz (6dB) 3kHz (60dB) FM 12kHz (6dB)
Dynamic Range	106dB (300Hz i.f. bandwidth)
Image Rejection	70dB or better
IF Rejection	70dB or better
PBS Range	±1kHz or more
Notch Depth	40dB or more
Antenna	50Ω Lo-Z
Impedance	600Ω Hi-Z
Attenuator	20dB
AGC	10dB or less for 3μV to 100mV signal
AF Output	1W into 4Ω with 10% or less distortion
Line Output	1mW into 600Ω at 10% distortion
RS-232C	4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity
Power Supply	100/120/220/240V a.c. ±10% 35VA or less; 12-16V d.c. 25 watts or less
Dimensions	330 (w) x 143 (h) x 324mm (d)
Weight	9kg approx.

Abbreviations

A	amps
a.c.	alternating current
a.g.c.	automatic gain control
a.m.	amplitude modulation
BWC	BandWidth Control
c.w.	continuous wave (Morse)
d.c.	direct current
dB	decibels
dBμ	decibels relative to 1μV
ECSS	Exalted Carrier Selectable Sideband
f.m.	frequency modulation
FAX	facsimile
Hz	hertz
i.f.	intermediate frequency
kg	kilograms
kHz	kilohertz
m.o.s.f.e.t.	metal oxide silicon field effect transistor
MHz	megahertz
mm	millimetres
mV	millivolts
mW	milliwatts
p.p.m.	parts per million
r.f.	radio frequency
RTTY	Radio TeleType
s	seconds
s.s.b.	single sideband
s/chan	seconds per channel
s/n/	signal to noise
s/scan	seconds per scan
s/step	seconds per step
SINAD	SIgnal to Noise And Distortion
u.h.f.	ultra high frequency
V	volts
v.h.f.	very high frequency
VA	volt-amps (a.c. watts)
W	watts
°C	degrees Celsious
μV	microvolts
Ω	ohms

Summary

The NRD-535 is a logical and worthy successor in this line of well respected receivers. The price is high, but not unreasonable for what is a top quality receiver. I have no hesitation in recommending the NRD-535 to anyone with a serious interest in short wave listening.

In its basic form, the NRD-535 costs £1115.00.

My thanks to **Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire DE4 5LE. Tel: (0629) 580800** for the loan of the review model.

A Basic RTTY Receive-only Terminal Unit - Part 1

RTTY as a mode tends to be one that is frequently clouded with mystique and newcomers to this fascinating form of communication can be rapidly baffled or put off by the apparent cost of suitable equipment. Bernard J. Greatrix G4ICZ describes his simple-to-build AD-2 receive-only terminal unit aimed at the beginner.

Many years ago, the author was tempted to build an ST5 type terminal unit [1] using 'junk box' components and Veroboard. This was supplemented by a Creed 7B Telex machine that served for many years as a moderate, if noisy and bulky transceiver of RTTY, to say little of the many 'happy' yet frustrating hours cleaning and oiling the beast.

Having dispensed with this combination, and in later years drifting towards home computing, the idea of another RTTY station was reborn, with the thoughts that progress would have improved upon past performances. Scanning the adverts soon revealed that considerable sums of money could be spent on commercial terminal units and software. Needless to say the old ST5 was resurrected and a commercial RTTY program purchased as this seemed to be the most cost effective solution. I was on the air again at an outlay of slightly less than £15 (discounting the cost of the computer and radio transceiver, of course, which had other applications, anyway).

Being an eternal optimist, an even simpler system was sought - after all it took the best part of ten minutes to load a program that had many features I didn't need and in some instances couldn't understand. The aims of the exercise were to:

a. Produce a design which was as simple as possible, whilst maintaining a reasonably efficient operation and that didn't use 88mH inductors.

b. Keep costs to an absolute minimum - expanded as the project progressed to include both software and hardware costs.

I also wanted to power the terminal unit from the computer supply (+5V) and so eliminate some of the connections which had to be made.

This final aim, alas, was not achieved to my satisfaction and will be discussed later, but with the experimentation which ensued the AD-2 terminal unit came into being.

Amalgam of Ideas

The design is an amalgam of ideas which have appeared in a variety of magazines over the last few years, and based around an active band-pass filter [3]. The performance is certainly not "state of the art" but as the entire project costs only a few pounds to build, even using brand new components, it should enable the newcomer to RTTY or those who may be tempted, but put off by the cost of high performance/high price commercial equipment to at least try the mode and having reached the limits of simple devices move on to the more elaborate.

The original prototype was built using single 741 devices with subsequent versions tried out using quad op-amps using both dual and single polarity supply rails, i.e. CA084 or LM348 and LM324 devices respectively. The dual polarity version is shown in **Fig. 1.3.** and options are discussed later. Little or no difference was observed in the performance of either of the first two devices suggested above, although using the LM348 at only +5V demanded significant changes to the component values. It was also noted that the circuit *Q* was much lower than calculation, which tended to limit the use to strong signals with very little noise.

It should be emphasised that this is a basic receive only terminal unit. The author has used one with an LM324 totally powered with 5V d.c. from a Commodore 64, but its performance is lower than a similar unit with dual polarity rails.

At the end of the article is a very simple RS232-based terminal program for use on the Commodore 64 which shows just how simple receiving programs can be if you are prepared to dispense with 'memories', 'type ahead' and the like. I have only used the program on the above machine but it is believed that the same program could be used with other Commodore machines such as the Plus 4 as the 'basic dialect' and memory locations are very similar. Other popular home micros such as the Spectrum and BBC are understood to have user ports and equivalent communication capabilities. The appropriate user manuals and reference texts would need to be consulted before any connections are made to these machines.

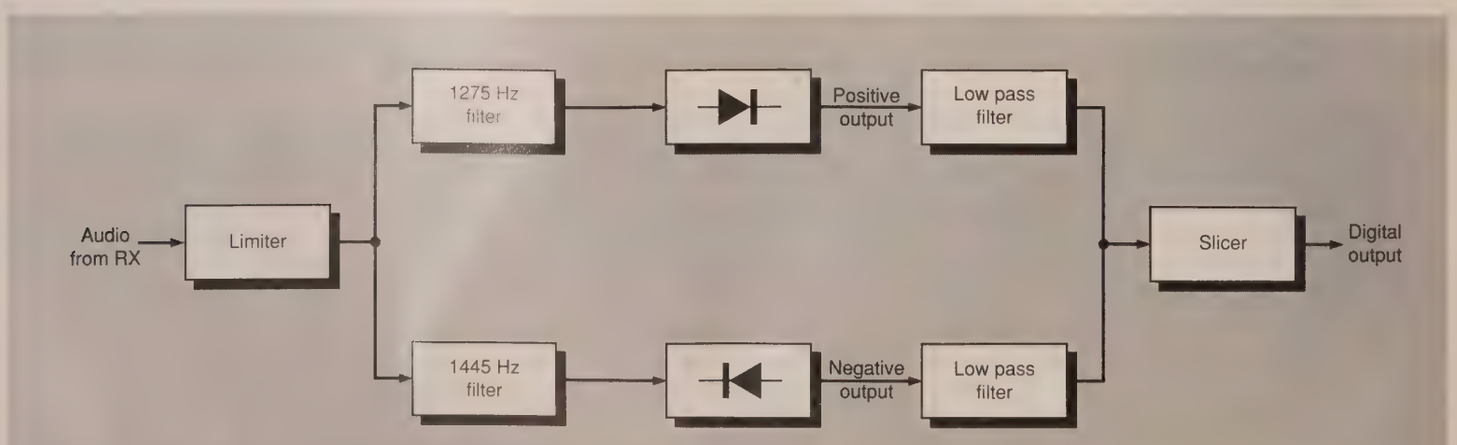


Fig. 1.1: Block diagram of a basic receive-only terminal unit.

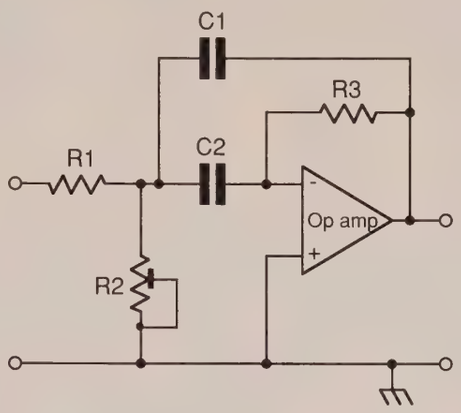


Fig. 1.2: Active band-pass filter calculations.

1. Select a value for C.
2. Select a value for Q where $Q = F_o/\text{Bandwidth}$.
3. Select a value for Av where Av = gain.
4. Select a value for F_o where F_o = centre frequency.
5. $R1 = Q/(Av * Pi * F_o * C)$
6. $R2 = Q/((2 * Q^2 - Av) * 2 * Pi * F_o * C)$
7. $R3 = 2 * Q/(2 * Pi * F_o * C)$

How It All Works

The block diagram of a RTTY receiver converter is shown in **Fig. 1.1**. This shows how the two tones (1275 and 1445Hz - in amateur circles at least) of a RTTY signal are separated, individually processed and re-combined to provide a serial digital signal suitable for consumption by either a mechanical 'Telex' machine or a computer-based system.

Audio from the receiver headphone socket or, preferably, a 600Ω line, is first passed through a passive low-pass filter formed by R1, R2, C1 and C2 giving a 3dB cut-off at approximately 2.5kHz. Signal overload is prevented by diodes D1 and D2. Integrated circuit IC1a operates as a high gain amplifier, so the output is a constant amplitude square wave for audio input signals greater than 250mV. At this point the signal is split and fed to two active band-pass filters IC2 and IC3, providing frequency discrimination. The filters are set independently by R8 and R9 to the required frequencies (1275 and 1445Hz). At this stage I should explain that the surrounding component values were calculated using the formulae given in **Fig. 1.2** [3] and to ease this effort LISTING 1 gives a computer program enabling the user to try as many changes as is though necessary with the components to hand.

My own values were: C = 15nF - the junk box had about two dozen of these; Q = 26; Bandwidth = 55Hz (i.e. approx 25Hz either side of the necessary tone, plus a bit for drift); Av = 0.9 - Less than 1 to prevent 'ringing'; Fo = 1275/1445. The program also allows for 1700Hz and 2125Hz, thus permitting 425Hz and 850Hz shifts occasionally found on h.f. transmissions.

Following selection of the two wanted tones by IC2 and

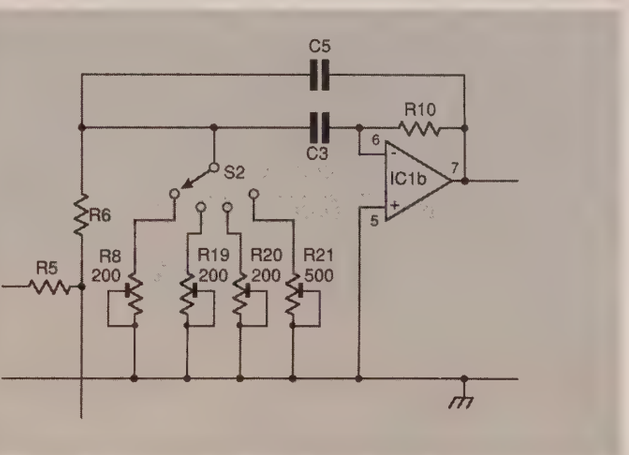


Fig. 1.4: Modifications to the circuit of the AD-2 terminal unit to add extra shifts and variable shift.

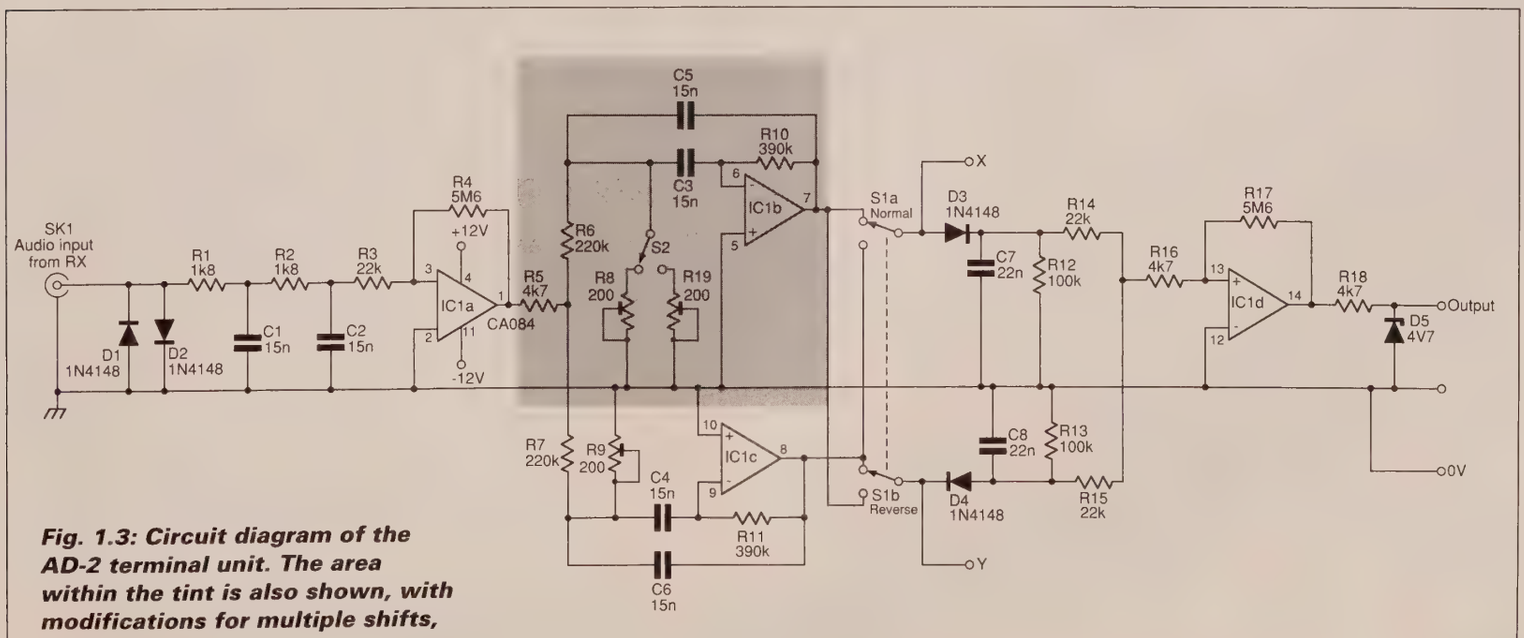


Fig. 1.3: Circuit diagram of the AD-2 terminal unit. The area within the tint is also shown, with modifications for multiple shifts, in Fig. 1.3.

IC3, the tones are rectified and filtered by D3, D4, R12-R15, C7 and C8 to provide alternative positive or negative d.c. levels, which are then combined and amplified by IC4 to provide the required serial digital output. Diode D5 is added to provide 'belt and braces' protection of the computer. All that remains now is to buffer this signal to suit the computer.

Tuning

Tuning to a RTTY signal can be done very simply by ear - the aim being to hear both tones equally, but is best done with some form of visual display. My own preference is to connect the active filter outputs to the X and Y plates of an oscilloscope (a rather old Heathkit OS2) providing a rather rounded cross when correctly tuned to the incoming signal. Incidentally the sharpness of the horizontal and vertical ellipses forming the cross is also a rough measure of the filter *Q*. A small d.c. amplifier/buffer with l.e.d.s will also give an indication of the state of tuning but I find them rather difficult to assess due to the constant flickering.

Acknowledgements and References

[1] ST-5 *Radcom* March 1977 page 202.
[2] *RTTY the Easy Way* BARTG
[3] *ARRL Handbook 1987* page 7.10
[4] *Commodore 64 Programmers Reference Guide.*

In Part 2 we will start the construction of the AD-2 terminal unit.

Fig. 1.5: Graph showing gain and phase v frequency as produced by Number One Systems ANALYSER II software run on a 286 PC clone. The graph was plotted using Excel on a Macintosh SE.

Abbreviations

d.c.	direct current
dB	decibels
Hz	hertz
kHz	kilohertz
mH	millihenries
mV	millivolts
Q	'goodness'of a tuned circuit
RTTY	RadioTeleTYpe
V	volts
Ω	ohms

```
10 REM ::: Listing No 1.
20 :
30 :
40 REM ACTIVE FILTER CALCULATOR
50 REM TO CALCULATE RESISTOR VALUES
60 REM FROM REQUIRED PARAMETERS
70 REM ::: G4ICZ JANUARY 1991
80 :
90 :
100 FOR X=1 TO 4: READ F(X): NEXT
110 DATA 1275, 1445,1 700, 2125
120 :
130 INPUT "ENTER BANDWIDTH HZ"; BW
140 INPUT "ENTER GAIN (EG 0.6)"; AV
150 INPUT "ENTER CAPACITANCE (EG 22E-9)"; CA
160 PRINT: PRINT
170 PRINT " HZ R1 R2 R3 Q"
180 FOR X=1 TO 4
190 Q=F(X)/BW: W0=2*PI*F(X)
200 R1=INT(Q/(AV*W0*CA)/1E3+.5)
210 R2=INT(Q/((2*Q^2-AV)*W0*CA)+.5)
220 R3=INT((2*Q)/(W0*CA)/1E3+.5)
230 PRINT F(X); R1"K "; R2;" "; R3"K";" ";
INT(Q+.5)
240 NEXT X
```

Note PI is available as a 'shifted' character (just to the left of the RESTORE key) on the CBM64.

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WHAT IS A SCANNER?
The scanner explained

COMPETITION
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MARINE BAND FREQUENCIES ON THE FAIRMATE 100

NEWSCAN

ALINCO's

Cracking New Baby Scanner
DJ-X1. 500kHz-1.3GHz

"A Scanner of Unrivalled Performance"

Specification:

Modes:	AM/Narrow FM/Wide FM
Steps:	5, 9, 10, 12.5, 20, 25, 30, 50, 100kHz
Antenna:	50Ω BNC
Supply:	6-15V DC (Internal 9V AA)
	24mA (Battery save.)
Dimensions:	110 x 53 x 37mm
Weight:	370g
Configuration:	AM/FM Triple conversion
Sensitivity:	NBFM -8dB (12dB SINAD)
	AM -2dB (10dB S/N)
Memories:	100 in banks.

STOP PRESS!!!
"Sensitivity far better than its obvious rivals" says Japanese magazine review

The DJ-X1 scanner represents a major step forward in scanner design. It heralds the era of the compact monitor receiver that really can be termed "pocket size". Alinco have managed to produce a receiver that has until now, been kept a close secret even to those in the industry. Recognising the fact that most handheld scanners are too large to be carried inconspicuously, ALINCO set about designing a receiver that bristled with the latest features, had a good battery life, and yet took up half the size of its rivals.

The DJ-X1 is the culmination of an extensive design programme from one of the most dynamic manufacturers of communications equipment in Japan today. It has an unbelievably low current drain of just 24mA on battery save and using 6 AA cells this will give extensive monitoring time. And even if you accidentally leave the receiver switched on, it will turn itself off after a pre-programmed time, thus further preserving battery power. Comprehensive scanning facilities include 3 speeds, and 100 memories are provided for flexible storage of scanned channels.

For further information on this amazing receiver contact us today or visit your local approved dealer who will be pleased to help.

£269

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ALINCO (UK) Ltd.

22 Main Road, Hockley, Essex. SS5 4QS

Tel: 0702 206835

What is a Scanner

Alan Gardner

It's only during the past few years, that the use of scanning receivers has become really popular in this country. Short wave listening has always been popular, permitting you to listen to signals from different corners of the globe in the comfort of your own home. In contrast, a scanning receiver only allows you to monitor relatively local signals, but these are often just as interesting and can range from amateur, maritime and aircraft transmissions to satellite and space communications.

This recent upsurge in interest is partially due to the increase in public awareness of personal communications devices such as Cellular and Cordless telephones and partially due to the availability of scanning receivers. Although scanners have been around for more than ten years, it is only with the advent of microprocessor control circuits and surface mounted components that the cost and performance of such receivers has made v.h.f. / u.h.f. listening possible for people other than professional users or dedicated hobbyists.

What Can a Scanner Do?

Most scanning receivers have two main modes of operation. The first of these is usually referred to as the 'SCAN' mode and is where this type of receiver gets its name from. In the Scan mode frequencies of interest need to be pre-programmed into a number of 'MEMORY' channels. When Scan is selected the receiver sequentially tunes to each memory channel until a signal is found. The scan then stops until the transmission ends or a predetermined period of time has elapsed, at which point the scan continues until another signal is found. By scanning memory channels it is possible to automatically monitor a large number of different frequencies without having to constantly operate a tuning knob. This makes it particularly useful when frequencies are known but the transmissions are brief - such as with aircraft communications.

All of this is fine if you know what frequencies are being used - if you don't you will need to use the 'SEARCH' mode. This is the other main method of operation offered on most models of scanning receiver. In this mode, the receiver automatically searches for signals within pre-determined frequency limits set by the user. As in the scan mode, the search stops when a signal is found. The frequency can then be transferred to a memory channel from which it can be instantly recalled at the touch of a button. Some receivers can do this automatically so all you need to do is set up a search band and then let the scanner do all the hard work for you.

Most modern designs of scanning receiver have several hundred memory channels which are often divided into banks of 10 or more. These can then be selected individually or as a bank for inclusion in a scan. The ability to temporarily remove a memory channel from a scan is usually referred to as a 'LOCKOUT' function and on some models is also available in the search mode in order to prevent the receiver stopping on specific frequencies.

Scanning receivers tend to fall into one of three categories - Base station, Mobile and Hand-held. The latter being the most popular amongst users at the moment. Base station models tend to be fairly large and have a built-in mains supply. They have the advantage of being easy to operate because the controls are reasonably sized and they normally have a better performance than the other types. This is important when an external antenna is used or if you live in a city where a lot of strong signals are likely to be present.

Models designed for mobile use tend to be more compact than their base station counterparts as they operate from an external 12V d.c. supply and so do not have to incorporate a bulky mains transformer. They generally have a reasonable performance and often work as well as as dedicated base stations.

Hand-held scanners are designed just for that purpose. They have to be small, lightweight and contain their own batteries. In order to be able to meet these requirements, they may have to compromise on performance which may be disappointing when used with anything other than the supplied antenna. In addition, because of the small size, the user often has to operate several controls in sequence in order to select particular functions. However, both of these drawbacks are usually offset by the convenience of being able to carry the receiver to particular events or locations.

In the UK it is particularly important to choose a model of scanning receiver that is suited to the types of transmission likely to be heard. Several models currently available were originally designed for the American market and may not be entirely suitable for use in this or other European countries. The main points to look out for are the frequency coverage - which in modern designs tends to be continuous from 25-550MHz, any additional ranges should be treated as a bonus. The tuning step size which should include 25, 12.5 and 5kHz steps, and be manually selectable, and finally what is perhaps the most important item, ensure that both a.m and n.b.f.m. modes are available and are manually selectable. Additionally w.b.f.m. may be found on some models. This is useful if you wish to listen to TV and radio broadcasts including East European stations in the 60-80MHz band.

Where Can I Find Out More?

Right here of course - *Short Wave Magazine* has a regular column devoted to Scanning in which readers questions are answered. Other columns in the magazine feature items of interest to scanning enthusiasts and new products are frequently reviewed. A good general guide to the hobby which I can thoroughly recommend is Peter Rouse's book *Scanners* , which is available from the *SWM* Book Service. Once you own a scanner and want to know where to find particular transmissions you can try *The Complete VHF/UHF Frequency Guide* which is also available from *SWM*.

Cover credit. AOR (UK) Ltd. kindly loaned the range of scanners featured on our front cover.

Marine Band Frequencies on the Fairmate HP 100E

The Fairmate HP 100E, along with the practically identical AOR, are extremely popular. The wide frequency range available, ease of carrying and the flexible power requirements make them probably the most versatile scanners on the market today. T. A. James explains how they can be programmed for the Marine Band frequencies.

The very flexibility and choice of programmable functions on this type of scanner can lead to some difficulties until you have learnt how to 'fly' them. Many new purchasers are disappointed with the performance initially, but this can usually be put down to the lack of understanding of how to program the memory scans. The scanners are usually delivered with a some pre-set frequency limits in each bank in the SEARCH MODE, which can be changed if you wish and some frequencies programmed into each bank of the SCAN MODE. Whilst the frequencies already inthe SEARCH MODE memory banks are relevant and contain many potentially interesting frequencies, the SCAN MODE memory banks are pre-loaded with frequencies that, the author suspects, are only put in to initially test the machine and do not have much relevance to the individual user.

Bewilderment

It would be as well at this stage to go through the meaning and difference of these two modes as this can lead to the original, and temporary, bewilderment.

In SEARCH MODE the scanner moves through all the search banks in numerical order seeking and transmission within the pre-set upper and lower limits of the frequencies of the search bank it happens to be in at that time. It does this logically i.e. one after the other in numerical order. It can be made to search any single bank or number of banks if you wish, but if you do not LIMIT this search, it will go through all the search banks and start again at zero. The problem with SEARCH MODE is, because it is such a wide search, it misses many transmissions due to either having gone past the frequency of the a transmission already or it has not got there yet. The narrower the search the more chance of picking up a transmission.

This is where SCAN MODE comes in. By programming a number of known frequencies into each scan bank we can improve our chances of picking up a transmission because, presumably, we have only put the frequencies in that we we expect to hear where at our location. It would be a waste of time putting the frequency for Glasgow Airport in the scan if you were listening in Cornwall - you could not hear it and it would take up scan time.

In SCAN MODE the scanner has a scan rate of some 20 channels per second, so it follows that it takes some 5 seconds to scan a bank with 100 frequencies in its memory - more than long enough to pick up any transmission.

Frequency Lists

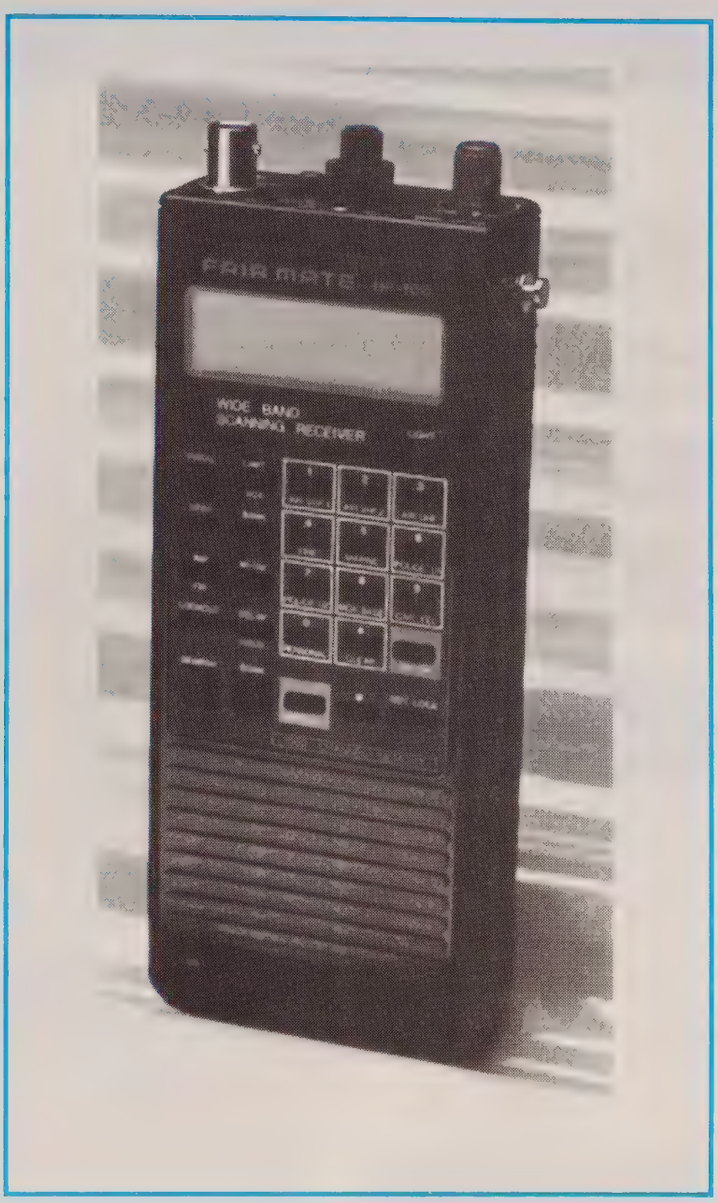
It is, of course, necessary to know the frequency before you can place it into the memory of the SCAN mode . Excellent frequency lists are offered by many advertisers in this magazine. Some interesting frequencies may be picked up during operation in the SEARCH mode. Make a note of these for inclusion in the memory of your SCAN mode. Do not try to enter them directly from SEARCH mode until you are really confident in the programming and the effect of programming in SCN mode.

To place a frequency in the memory of the SCAN mode first press MANUAL, the frequency already shown inthe window will disappear and the small MHz sign will start to flash. Enter the frequency, not forgetting the decimal point. Then press ENT (enter). Next press PROG, the exisitng Bank Number will disappear. Enter the Bank Number you wish it to be placed in and that is it.

Put simply, it is MANUAL - Enter frequency - ENT - PROG - Enter Bank Number.

One world of warning. If you forget to press PROG or forget to enter a new bank number it will put the new frequency into the bank number that was in the window when you started, thus possibly messing up a nice tidy scan in another bank. There is nothing more annoying than picking up Jimmy Young in the middle of an airband scan. The scan will stop at that point because, unlike airline pilots, his transmissions do not stop.

Always try to place your chosen frequencies in the SCAN in a tidy logical manner. As you already know you have 10 banks of 100 frequencies that you can place in memory. It is possibly easier to follow the manufacturers guidelines in the SEARCH mode and put the civil airband SCAN into



Bank 1, (Bank Nos 100-199), military airband SCAN into Bank 2 (Bank Nos 200-299), Marine band scan into Bank 6 (Bank Nos 600-699), etc.

Potentially Difficult

One of the most potentially difficult blocks of frequencies to SCAN is the marine band. This is because firstly they converse with each other using channel numbers rather than frequencies. The reason for this is that it is easier for a mariner to remember a channel number than a six-digit frequency. The second difficulty is caused by the fact that some, but not all, transmissions are in what is termed DUPLEX. This means that, even though both ship and shore are talking to each other on the same channel, the ship is transmitting on one frequency and the shore is transmitting on another. These two frequencies are as far apart as possible. This is for technical reasons which are outside the scope of this article.

If we were to program the frequencies into our SCAN for the marine band in a haphazard way, we could pick up a transmission say from a ship to the shore and, presuming we are inthe DELAY mode, after the ship has finished speaking and the delay has run out, the set will start scanning again. now, we wish to listen to the other half of the conversation but the frequency carrying this half could be anywhere in the memory. You may not even get there by being blocked by another transmission from another source. The first rule is always program the two frequencies of a duplex channel alongside each other. WE can then, by utilising the very clevel UP/DOWN tuning knob onthe top of the scanner, switch between the two frequencies that make up the channel. This frequency will only be one click of this knob in either direction. If you click it one way and do not pick up the reply, turn it two clicks in the opposite direction to go past where you picked up the original signal and back one frequency. This, of course, will be easier if you utilise the HOLD facility from the start where it will lock onto the original frequency and stay there.

AUX Facility

Another facility that is very useful for marine band listening on these scanners is the AUX facility. This feature allows any one, preset channel, to be interrogated automatically every 2 seconds. Channel 16 is the initial calling channel, the distress channel and the urgent channel. It is from here that the initial call takes places with both parties agreeing a channel to move to. It is useful to make the memory number that holds Channel 16 the AUX channel. This means you will hear everyone that calls. You can then decide whether to follow them or keep scanning.

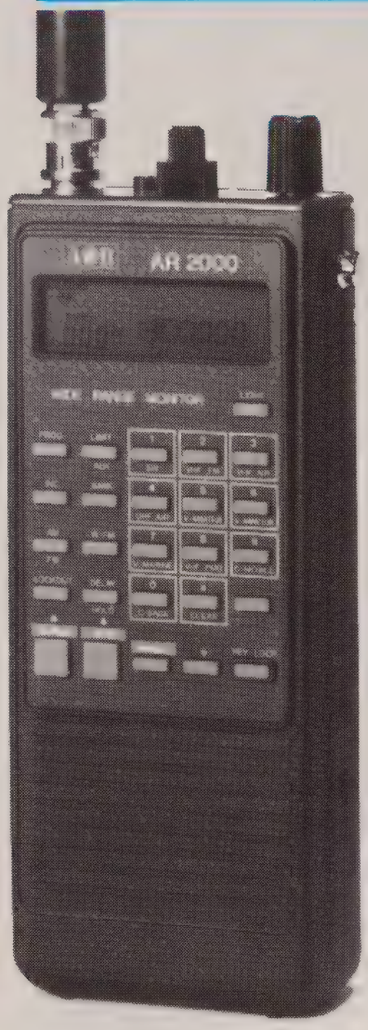
Table 1 is a suggested way to lay out your scan. In this case the scan in placed in Bank 6, so all the numbers start with a 6. If you put the scan into bank 9, all the numbers would start with a 9, of course.

You will find that in many sea areas a lot of the channels are unused. In that case use the CLEAR facility to wipe them out of memory rather than the LOCKOUT facility. The LOCKOUT facility still scans that frequency but it does not show up. We should be aiming at the shortest possible scan consistent with the number of frequencies we wish to scan.

Table 1

Bank 6

Bank No	Freq	
600	156.00	Coastguard/lifeboat
601	156.03	Ch 60 ship
602	160.63	Ch 60 shore
603	156.05	ch 1 ship



Win an AOR 2000

Free to enter competition

Twenty years ago you would have needed a rack full of equipment in order to be able to monitor v.h.f./u.h.f. transmissions. Ten years ago, crystal controlled equipment was just becoming available which would allow you to scan up to ten frequencies within a small band. Seven years ago the first synthesised scanning receivers offering continuous frequency ranges and tens of memory channels were just becoming available. Three years ago the first continuous coverage hand-held scanners with hundreds of memory channels were starting to appear. The past two years have seen the introduction of scanners with thousands of memory channels, continuous frequency coverage from below 1MHz to over 1GHz, single sideband reception, multiple scanning modes and computer control. Whatever can we expect next? you may ask. Well that could depend on you.

AOR LISTEN TO YOU

AOR have been responsible for many of the major innovations in scanning receiver design over the past ten years and they would like to hear your ideas for future generations of scanners. In order to add a little bit of an incentive, they are giving one of their latest models, an AR2000 hand-held receiver as a prize for the best new idea. Unlike normal competitions we are not just giving this superb prize away - you will have to work for it! You don't have to answer any questions or write a winning slogan but you will have to do some serious thinking in what we believe is the first competition of its type in this magazine.

RULES

The rules are simple - all you have to do is write down what feature or features you would like to see incorporated in the next generation of scanning receivers. It could be a particular method of operation, a new style case design or a revised front panel layout. Anything that you think would be an improvement or would like to see.

The most practical and innovative ideas will be selected by The Editor together with 'Scanning' columnist Alan Gardner and a winner chosen. Although only one person will receive the prize everyone entering should benefit as we will be passing on your best ideas to AOR, many of which could be incorporated into future designs.

You can either describe or sketch your ideas but they must only be on one side of an A4 sheet of paper with your name and address clearly printed on the opposite side. Try and be concise with your description and make sure that you clearly state the most important features.

We are expecting a large number of entries for this competition so it is important that you follow these instructions in order to avoid your entry being consigned to the waste paper bin.

Once you have completed your entry send it to: AR2000 Competition, PW Publishing Ltd., Enefco House, The Quay, Poole, Dorset BH15 1PP. The winner will be announced in a future edition of *SWM*. The closing date for all entries is 31 December 1991.

Unfortunately, the competition is not open to employees of PW Publishing Ltd, its authors or advertisers in *Short Wave Magazine*. Each entry must be accompanied by the appropriate 'flash' from the bottom of this page. The Editor's decision is final and no correspondence will be entered into.

WHAT SCANNER COMPETITION
AUTUMN 1991

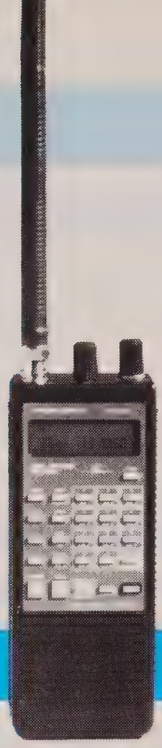
NEWSCAN

Another First

Alinco have introduced their first scanning receiver and it is hoped that the first shipments will be made at the end of October or early November.

Designated the DJ-X1, it comprises a very compact design measuring only 110 x 53 x 30mm, thus making it one of the smallest models available. Frequency coverage is from 500kHz to 1300MHz without gaps. It has the widest number of programmable steps ever to be made available: 5/9/10/12.5/20/25/30/50 and 100kHz. Modes include a.m., n.b.f.m. and w.b.f.m. and sensitivity is claimed to be unsurpassed.

The price has not yet been announced, but it promises to be highly competitive! For those needing further details, contact **Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS. Tel: (0702) 206835. FAX: (0702) 205843**.



Dual Airband Scanner

Nevada have announced the world's first dual airband scanning receiver, covering both civil and military airbands.

The set has 1000 memory channels in ten search banks that can be scanned at over 20 channels per second.

As a dedicated airband radio, the HP1000AB has been designed to give outstanding performance in the civil/military airbands compared to other wide-band scanning receivers.

The HP1000AB will sell at £229 (including VAT) including charger, carrying case, earphone and NiCad Batteries.

The first shipment is due to arrive in early November. More details can be obtained from **Nevada Communications, 189 London Road, North End, Portsmouth, Hants PO2 9AE. Tel: (0705) 662145. FAX: (0705) 690626**.

Scanning in Japan

Most major scanning receiver manufacturers in Japan will, in future, delete the cordless and cellular frequencies used in Japan from their products for the Japanese domestic market. This will also apply to amateur radio transceivers that include these frequencies as an extra receiving feature.

The recently introduced Icom R-7100 is the first receiver to comply with this request on the Japanese domestic market, and has all frequencies in cellular and cordless use deleted.

Thanks to **SSE** for this information.

New Sony Centre

Bredhurst Electronics Ltd of Handcross, West Sussex have been appointed as a Sony Communications Centre. They will be stocking the complete range of Sony World Band Receivers and accessories to compliment their existing selection of radio products from all major manufacturers.

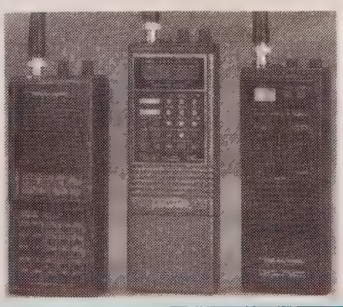
Bredhurst Electronics Ltd, High Street, Handcross, West Sussex RH17 6BW. Tel: (0444) 400786. FAX: (0444) 400604.

In Stock

Link Electronics of Peterborough have informed me that they now have available, in stock, the latest offerings from Realistic.

The *Patrolman* PRO-41 is a 10-channel scanner covering 66-88 and 137-174MHz in 5 and 12.5kHz steps. This hand-held scanner requires five AA NiCads or Alkaline batteries or a 12V external power source. It comes complete with antenna and belt clip and can accept an external speaker or earpiece. It replaces the PRO-38 and can be bought for £99.95.

The *Patrolman* PRO-35 is a 100-channel scanner covering 66-88MHz in 5kHz steps and 108-136.975MHz in 12.5kHz steps. This hand-held scanner comes complete with NiCads and charger or it can be powered from a 12V external power source. It features both channel lockout, priority channel facilities as well as 10-channel storage banks. It also has a monitor memory for memorising a frequency during scan, frequency search that allows scanning between two frequencies and two-speed scan and search.



This is a new entry into the mid-range hand-held scanner market and has been designed for the airband, p.m.r. or amateur enthusiast.

The PRO-37 has yet to be released. However, this will be a 200-channel hand-held scanner with Hyper-Scan to cover the top end of the hand-held market. Details will follow so keep an eye on the *SWM* news pages.

Link Electronics, 228 Lincoln Road, Peterborough PE1 2NE. Tel: (0733) 345731. FAX: (0733) 346770.

Scanmaster Scanner Controllers

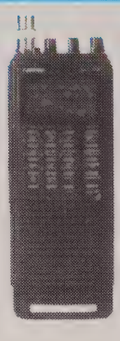
Peter Longhurst of Garex Electronics has informed us that he had taken over the manufacture of the Scanmaster scanner controllers from David Husband of EMP Ltd. This will allow David to do what he does best - programming and designing.

If you would like details of the Scanmaster, then contact:

Garex Electronics, Station Yard, South Brent, South Devon TQ10 9AL. Tel: (0364) 72770. FAX: (0364) 72007.

WHAT SCANNER

Fairmate HP200



TYPE: hand-held
COVERAGE 500kHz-1300MHz
MODES a.m., f.m., w.b.f.m
SENSITIVITY below 2MHz less than 10µV for 20dB, 15-500 & 800-1300MHz less than 0.5µV for 12dB SINAD f.m., 15-600MHz less than 2µV for 20dB a.m. 60% modulation, 15-600MHz less than 3µV for 30dB S/N w.b.f.m.
RESOLUTION 5-995kHz selectable
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT more than 100mW for 10% t.h.d
SCAN RATE 20 channels per second
SEARCH RATE less than 40 channels per second
MEMORIES 1000 in 10 x 100 channels
FEATURES NiCads, carry case, shoulder strap, belt clip, d.c. cable, earpiece, three antennas and charger
REVIEWED
PRICE £269

AOR AR2000

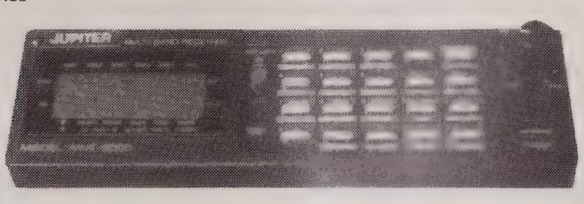
TYPE: portable
COVERAGE: 500kHz-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: n.b.f.m. approx 0.5µV @ 12dB SINAD across most of range; a.m. approx 3µV @ 10dB S/N across most of range
RESOLUTION: 5/12.5kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: >100mW @ 10% distortion
SCAN RATE: up to 20 channels per second
SEARCH RATE: up to 40 steps per second
MEMORIES: 1000 in 10 x 100 channels
FEATURES: supplied with single wide-band whip antenna, a.c. charger, NiCads, 12V d.c. lead fitted with cigar lighter plug, soft case with carry strap and belt hook.
REVIEWED:
PRICE: £259

Yupiteru MVT-7000

TYPE: hand-held
COVERAGE: 8-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: n.b.f.m. >0.5µV for 12dB SINAD, w.b.f.m. 0.75µV for 12dN SINAD, a.m. 0.5µV for 10dB S/N
RESOLUTION: 5/10/12.5/25/50/100kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT 120mW into 8Ω
SCAN RATE: 16 channels per second
SEARCH RATE: 20 steps per second
MEMORIES 200
FEATURES: variable display contrast, ten user-defined search patterns
REVIEWED: August 1991 *Short Wave Magazine*
PRICE: £289

Yupiteru MVT-6000

TYPE base/ mobile
COVERAGE 25-550 & 800-1300MHz
MODES a.m., f.m.
SENSITIVITY 25-550MHz f.m. 0.5µV 12dB SINAD, 800-1300MHz f.m. 0.8µV 12dB SINAD, a.m. 0.7µV 10dN S/N
RESOLUTION 5/10/12.5/25 or 30kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT
SCAN RATE
SEARCH RATE 8 or 20 steps per second
MEMORIES 100 in 5 x 20 channels
FEATURES selective bank scanning, NiCads, telescopic whip, carry case & strap, belt clip
REVIEWED
PRICE £299



Yupiteru VT-125UK

TYPE: airband hand-held
COVERAGE 108-142MHz
MODES a.m.
SENSITIVITY: >0.5µV
RESOLUTION 25/50kHz
IMAGE REJECTION:
IF STAGE
AUDIO OUTPUT 60mW into 8Ω
SCAN RATE 20 channels per second
SEARCH RATE
MEMORIES 30
FEATURES: l.c.d. signals meter, l.c.d. backlight
REVIEWED
PRICE £179

AOR AR2800

TYPE: base/mobile
COVERAGE 500kHz-600MHz & 800-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m., u.s.b., l.s.b., c.w.
SENSITIVITY n.b.f.m. approx 0.5µV @ 12dB SINAD, a.m. approx 3µV @ 10dB S/N across most of range
RESOLUTION 5kHz
IMAGE REJECTION
IF STAGE:
AUDIO OUTPUT:
SCAN RATE up to 20 channels per second
SEARCH RATE up to 20 steps per second
MEMORIES 1000 in 10 x 100 channels
FEATURES supplied with a.c. power supply, whip antenna, d.c. lead, mobile mount, manual and fitted with internal NiCad battery pack
REVIEWED
PRICE £395

Yupiteru MVT-5000

TYPE hand-held
COVERAGE 25-550 & 800-1300MHz
MODES a.m., f.m.
SENSITIVITY 25-550MHz f.m. 0.5µV 12dB SINAD, 800-1300MHz f.m. 0.8µV 12dB SINAD, a.m. 1.5µV 10dN S/N
RESOLUTION 5/10/12.5/25 or 30kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT
SCAN RATE
SEARCH RATE 8 or 20 steps per second
MEMORIES 100 in 5 x 20 channels
FEATURES selective bank scanning, NiCads, telescopic whip, carry case & strap, belt clip
REVIEWED
PRICE £229

Fairmate HP-1000AB

TYPE hand-held
COVERAGE 108-143, 220-400MHz
MODES a.m., f.m
SENSITIVITY: a.m. better than 0.25µV for 10dB S+N/N, f.m. better than 0.25µV for 12dB SINAD
RESOLUTION 5-995kHz in multiples of 5 or 12.5kHz
IMAGE REJECTION better than -75dB
IF STAGE
AUDIO OUTPUT 100mW for 10% or less t.h.d
SCAN RATE over 20 channels per second
SEARCH RATE
MEMORIES 1000
FEATURES
REVIEWED
PRICE £229

Shinwa SR001

TYPE: base/mobile
COVERAGE: 25-999.995MHz
MODES: a.m., w.b.f.m., n.b.f.m.
SENSITIVITY: -4dBµV or lower (12dB SINAD)
RESOLUTION: 5/10/12.5/20/25/50/100kHz
IMAGE REJECTION: 48.5dB
IF STAGE:
AUDIO OUTPUT: 2W into 4Ω
SCAN RATE: over 20 channels per second
SEARCH RATE: (v.f.o.) 35 channels per second
MEMORIES: 200 in 20 x 10 channels
FEATURES:RS-232C port, wireless remote controller, up to three option units can be incorporated including the external ROM
REVIEWED:
PRICE: £299

Nevada MS 1000

TYPE mobile/base
COVERAGE 500kHz-600MHz & 800-1300MHz
MODES a.m., n.b.f.m., w.b.f.m.
SENSITIVITY a.m. 500kHz-2MHz - 10µV 20dB; a.m. 0.7-1µV @ 10dB S/N, f.m. 0.5µV @ 12dB SINAD, w.b.f.m. 1µV @ 20dB S/N, high band f.m. 0.7-1µV @ 12dB SINAD
RESOLUTION 5/12.5kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT 500mW or more
SCAN RATE 20 channels per second
SEARCH RATE 20 steps per second
MEMORIES 1000 in 10 x 100 channels
FEATURES user selectable search steps from 5-995kHz, selectable 10dB attenuator, keypad or rotary control, all metal case
REVIEWED May 1991 *Short Wave Magazine*
PRICE £279

Realistic PRO-2006

TYPE base/mobile
COVERAGE 25-520 & 760-1300MHz
MODES a.m., w.b.f.m., n.b.f.m
SENSITIVITY w.b.f.m. 3µV for 25-520 & 760-1100MHz, 10µV for 1100-1300MHz; n.b.f.m.3µV; a.m 2µV 25-520 & 760-110MHz, 5µV for 1100-1300MHz
RESOLUTION 5/12.5/50kHz
IMAGE REJECTION 60dB
IF STAGE
AUDIO OUTPUT 1.3W nominal
SCAN RATE 26 or 13 channels per second
SEARCH RATE
MEMORIES 400 in 10 x 40 channels
FEATURES
REVIEWED February S1991 *Short Wave Magazine*
PRICE £330

WHAT SCANNER

Realistic PRO-38

TYPE: hand-held
COVERAGE: 68-88, 136-174, 406-512MHz
MODES: f.m.
SENSITIVITY: 68-88MHz = 0.5µV normal, 2µV limit; 136-174MHz = 0.7µV normal, 3µV limit; 406-512MHz = 0.7µV normal, 4µV limit
SELECTIVITY: At 155MHz -6dB = ±10kHz, -50dB = ±17kHz
RESOLUTION:
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: nominal 260mW
SCAN RATE: 10 channels per second
SEARCH RATE:
MEMORIES: 10
FEATURES: Keyboard lock switch, l.c.d. channel readout, jack for earphone, belt clip and flexible antenna supplied.
REVIEWED: Short Wave Magazine October 1988 (£1.65 back issue)
PRICE: £80

AOR AR2001

TYPE: base station
COVERAGE: 25-550MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: n.b.f.m. = 0.39µV @ 12dB SINAD @ 70MHz
SELECTIVITY: n.b.f.m. = ±13kHz @ 6dB, ±21kHz @ 70dB, w.b.f.m. = ±180kHz @ 6dB, ±446kHz @ 70dB, a.m. = 13.5kHz @ 6dB
RESOLUTION: 5, 12.5, 25kHz
IMAGE REJECTION: -50dB
IF STAGE: 750MHz, 455kHz
AUDIO OUTPUT: 1W @ 10% t.h.d
SCAN RATE: 5 channel per second
SEARCH RATE: 6 seconds per MHz
MEMORIES: 20
FEATURES
REVIEWED: Practical Wireless May 1984 (£1.65 back issue)
PRICE: Available second-hand

Uniden Bearcat 70XLT

TYPE: hand-held
COVERAGE: 29-54, 135-174, 406-512MHz
MODES: f.m., a.m
SENSITIVITY: 29-54MHz = 0.4µV, 136-174MHz = 0.5µV, 406-512MHz = 0.7µV
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION: 5kHz
IMAGE REJECTION: -50dB
IF STAGE: 10.8MHz
AUDIO OUTPUT: 140mW at 10% t.h.d. into 8Ω
SCAN RATE: 15 channels per second
SEARCH RATE: 15 channels per second
MEMORIES: 20
FEATURES
REVIEWED:
PRICE: £200*

Realistic PRO-2004

TYPE: base/mobile station
COVERAGE: 25-520, 760-1300MHz
MODES: a.m, w.b.f.m., n.b.f.m.
SENSITIVITY: w.b.f.m. 25-520 & 760-110MHz = 3µV, 1100-1300MHz = 10µV all @ 30dB S/N @ 22.5kHz; n.b.f.m. 25-520MHz = 0.5µV, 760-1300MHz = 0.3µV all at 20dB S/N @ 3kHz dev; a.m. 25-520 & 760-1100MHz = 2µV, 1100-1300MHz = 3µV all at 20dB s/n @ 60%
SELECTIVITY: n.b.f.m. & a.m. ±9kHz @ -6dB, ±15kHz @ -50dB; w.b.f.m. ±150kHz @ -6dB, ±300kHz @ -50dB
RESOLUTION: 5, 12.5 or 50kHz
IMAGE REJECTION: -60dB
IF STAGE: 611.5-607.505MHz, 48.5MHz, 455kHz (a.m.)
AUDIO OUTPUT: 1.8W @ 3% t.h.d.
SCAN RATE: 8 or 16 steps per second
SEARCH RATE: 8 or 16 steps per second
MEMORIES: 300
FEATURES: Lock-out key, squelch, priority function key and large l.c.d. read-out
REVIEWED: Short Wave Magazine April 1987 (£1.65 back issue)
PRICE: £330*

Uniden Bearcat 50XL

TYPE: hand-held
COVERAGE: 29-54, 136-174, 406-512MHz
MODES: a.m., f.m.
SENSITIVITY: 29-54MHz = 0.4µV, 136-174MHz = 0.5µV, 406-512MHz = 0.7µV for 12dB SINAD
SELECTIVITY: -55dB ±25kHz
RESOLUTION: 5kHz
IMAGE REJECTION: -50dB
IF STAGE: 10.8MHz
AUDIO OUTPUT: 500mW at 10% t.h.d. in 8Ω
SCAN RATE: 15 channels per second
SEARCH RATE: 15 channels per second
MEMORIES: 10
FEATURES
REVIEWED:
PRICE: £99

AOR AR-2002

TYPE: base/mobile station
COVERAGE: 25-550, 800-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: n.b.f.m. = 0.3µV, w.b.f.m. = 1.0µV both @ 12dB SINAD; a.m. = 0.5µV @ 10dB S/N
SELECTIVITY: n.b.f.m. ±7.5kHz @ 6dB, w.b.f.m. ±250kHz @ 60dB, a.m. = ±10kHz @ 70dB
RESOLUTION: 5, 12.5, 25kHz
IMAGE REJECTION: -50dB
IF STAGE: 750, 45.03MHz (w.b.f.m.), 455kHz (n.b.f.m./a.m.)
AUDIO OUTPUT: 1W @ <10% distortion
SCAN RATE: 5 channels per second
SEARCH RATE: 6 seconds per MHz
MEMORIES: 20
FEATURES: Tuning knob plus keypad, real-time clock, computer control facilities
REVIEWED: Practical Wireless December 1985 (85p photocopy)
PRICE: £487

Revco RS-2000E

TYPE: base station
COVERAGE: 60-179, 380-520MHz
MODES: a.m., f.m.
SENSITIVITY: v.h.f. f.m. = 0.5µV, u.h.f. f.m. = 1.0µV
SELECTIVITY: -60dB @ ±25kHz
RESOLUTION: 5kHz
IMAGE REJECTION:
IF STAGE
AUDIO OUTPUT: 2W
SCAN RATE: 5 or 10 channels per second
SEARCH RATE: 5 or 10 channels per second
MEMORIES: 70
FEATURES: Autio search and store
REVIEWED:
PRICE: £279*

Uniden Bearcat UBC-175XL

TYPE: base station
COVERAGE: 66-88, 118-174, 406-512MHz
MODES: a.m., f.m
SENSITIVITY: 29-54 & 136-174MHz = 0.3µV, 406-512MHz = 0.5µV, 118-136MHz = 0.8µV @ 12dB SINAD
SELECTIVITY: -45dB @ ±25kHz
RESOLUTION: 5kHz
IMAGE REJECTION: -55dB
IF STAGE: 10.85MHz, 450kHz
AUDIO OUTPUT: 800mW @ 10% t.h.d
SCAN RATE: 5 or 15 channels per second
SEARCH RATE: 5 or 15 channels per second
MEMORIES: 16
FEATURES: priority scan, channel lockout, auto squelch, short term memory back-up, wood veneer case
REVIEWED: Short Wave Magazine December 1987 (£1.65 back issue)
PRICE: £170

JIL SX-200N

TYPE: mobile/base station
COVERAGE: 26-88, 108-180, 380-514MHz
MODES: a.m., n.b.f.m
SENSITIVITY: f.m. = > 60dB @ ±25kHz, a.m. = >60dB at ± 10kHz
SELECTIVITY: 26-180MHz f.m. = 0.4µV, 380-514MHz = 1.0µV both at 12dB s/n, 26-180MHz a.m. = 1.0µV at 10dB s/n, 380-514MHz a.m. = 2.0µV
RESOLUTION: 5, 12.5kHz
IMAGE REJECTION
IF STAGE: 10.7MHz, 455kHz
AUDIO OUTPUT: 2W
SCAN RATE: 4 or 8 channels per second
SEARCH RATE: 5 or 10 channels per second
MEMORIES: 16
FEATURES
REVIEWED: Practical Wireless October 1981 (£1.65 back issue)
PRICE: £325*

Yaesu FRG-9600

TYPE: base station
COVERAGE: 60-905MHz (up to 460MHz for s.s.b.)
MODES: n.b.f.m., w.b.f.m., n.b.a.m., w.b.a.m., s.s.b
SENSITIVITY: n.b.f.m. = 0.5µV, w.b.f.m. = 1.0µV both @ 12dB SINAD, n.b.a.m. = 1.0µV, w.b.a.m. = 1.5µV both @ 10dB S+N/N, s.s.b. = 1.0µV @ 15dB S+N/N
SELECTIVITY: n.b.f.m. ±15kHz, w.b.f.m. ±180kHz, n.b.a.m. ±2.4kHz, w.b.a.m ±6kHz, s.s.b. ±2.4kHz all @ 3dB
RESOLUTION: 100Hz, 1, 5, 10, 12.5, 25 or 100kHz depending on mode
IMAGE REJECTION: 60-460MHz = -50dB, 460-905MHz = -40dB
IF STAGE: 45.754, 10.5MHz & 455kHz
AUDIO OUTPUT: 1W into 8Ω with less than 10% t.h.d
SCAN RATE: not given
SEARCH RATE
MEMORIES: 100
FEATURES: 0.6m whip antenna, 1.8m d.c. power cable, mobile mounting bracket & wire stand
REVIEWED:
PRICE: £500

AOR AR2500

TYPE: base/mobile
COVERAGE: 5-550MHz & 800-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m., u.s.b., l.s.b., c.w
SENSITIVITY: n.b.f.m. approx 0.45µV @ 12dB SINAD, w.b.f.m. approx 1µV @ 12dB SINAD, a.m approx 1µV @ 10dB S/N across most of range
RESOLUTION: 5kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: 500mW in 8Ω @ 10% t.h.d.
SCAN RATE: up to 36 channels per second
SEARCH RATE: up to 36 steps per second
MEMORIES: 1984 as 62 x 32 channels
FEATURES: 16 search banks, RS232 socket for computer control, supplied with a.c. power supply, whip antenna, d.c. lead, mobile mount and manual
REVIEWED:
PRICE: £419

JIL SX-400

TYPE: base station
COVERAGE: 26-520MHz (100kHz-1.4GHz with converters)
MODES: a.m., n.b.f.m., w.b.f.m
SENSITIVITY: v.h.f. f.m. = 0.5µV u.h.f. f.m. = 0.5µV both @ 12dB S/N; v.h.f. a.m. = 1.0µV, u.h.f. a.m. = 2.0µV both @ 10dB S/N
SELECTIVITY: f.m. = 60dB @ ±15kHz, a.m. = 60dB @ ±10kHz both with S/N 45dB
RESOLUTION: 5, 6.25, 10, 12.5kHz
IMAGE REJECTION: v.h.f. = 50dB
IF STAGE: 10.7MHz, 455kHz
AUDIO OUTPUT: 2W into 4Ω load
SCAN RATE: 4 or 8 channels per second
SEARCH RATE: 5 and 10 channels per second
MEMORIES: 20
FEATURES
REVIEWED
PRICE: £650*

Uniden Bearcat 100XL

TYPE: hand-held
COVERAGE: 66-88, 118-174, 406-512MHz
MODES: a.m., f.m
SENSITIVITY: 30-50MHz = 0.3µV, 118-136MHz = 0.8µV, 136-174MHz = 0.4µV, 406-512MHz = 0.5µV for 12dB SINAD
SELECTIVITY: 50dB at ± 25kHz
RESOLUTION: 5kHz
IMAGE REJECTION: -50dB
IF STAGE: 10.8MHz
AUDIO OUTPUT: 300mW at 10% t.h.d
SCAN RATE: 15 channels per second
SEARCH RATE: 25 frequencies per second
MEMORIES: 16
FEATURES: Priority channel, keyboard lock, auto squelch, battery low indicator, back-lit display
REVIEWED
PRICE: £190*

Realistic PRO-32A

TYPE: hand-held
COVERAGE: 68-88, 108-136 (a.m.), 138-174, 380-512MHz
MODES: a.m., f.m.
SENSITIVITY: 68-88MHz = 0.6µV, 138-174MHz & 380-512MHz = 1.0µV f.m. 20dB S/N at 3kHz deviation; 108-136MHz = 2µV a.m. 20dB S/N at 60% modulation
SELECTIVITY: -6dB @ ±9kHz, -60dB @ ±15MHz
RESOLUTION: 5, 12.5 or 25kHz
IMAGE REJECTION:
IF STAGE: 455kHz, 10.7MHz
AUDIO OUTPUT: 300mW
SCAN RATE: 4 or 8 channels per second
SEARCH RATE: 4 or 8 channels per second
MEMORIES: 200
FEATURES: lockout, delay and priority channel, helical antenna.
REVIEWED: Short Wave Magazine November 1987 (£1.65 back issue)
PRICE £240*

Regency HX850E

TYPE: hand-held
COVERAGE: 75-106 or 60-90, 118-175, 406-496MHz
MODES: a.m., n.b.f.m.
SENSITIVITY: v.h.f. f.m. = 0.7µV, u.h.f. f.m. = 1.0µV both @ 12dB SINAD, v.h.f. a.m. = 1.0µV @ 10dB s/n
SELECTIVITY: f.m./a.m. ±7.5kHz @ 6dB
RESOLUTION: 5, 10 & 12.5kHz
IMAGE REJECTION:
IF STAGE: 21.4MHz, 455kHz
AUDIO OUTPUT: 10mW @ 10% or less t.h.d.
SCAN RATE: 12 channels per second
SEARCH RATE: u.h.f. = 7 seconds per MHz; v.h.f. = 9 seconds per MHz
MEMORIES: 20
FEATURES: NiCads, flexible antennas and 240V charger supplied.
REVIEWED:
PRICE: £280*

WHAT SCANNER

Black Jaguar BJ200 Mark III

TYPE: hand-held
COVERAGE: 26-30, 50-88, 115-178, 210-280, 360-520MHz
MODES: a.m., f.m.
SENSITIVITY: f.m.=0.5µV for h.f. & v.h.f., 0.7µV for u.h.f. all 12dB SINAD; a.m.=1.0µV for h.f. & v.h.f., 1.5µV for u.h.f. all 10dB SINAD
SELECTIVITY: 60dB ±20kHz
RESOLUTION: 5, 10, 12.5kHz
IMAGE REJECTION: more than 40dB
IF STAGE:
AUDIO OUTPUT: 250mW into 8Ω
SCAN RATE: 10 channels per second
SEARCH RATE:
MEMORIES: 16
FEATURES: priority and memory lockout on scan, selectable a.m./f.m.
REVIEWED: What Scanner Autumn 1990 (with SWM)
PRICE: £199

Saiko SC-1600

TYPE: mobile
COVERAGE: 10MHz within 65-90MHz, 20MHz within 130-175MHz, 30MHz within 390-500MHz
MODES: n.b.f.m.
SENSITIVITY: 1.0µV for 10dB S/N
SELECTIVITY: ±15kHz@50dB, ±7kHz @ -6dB
RESOLUTION: 5kHz
IMAGE REJECTION: -40dB
IF STAGE: 10.7MHz, 455kHz
AUDIO OUTPUT: 1.5W @ 10% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 16
FEATURES: Squelch, delay key, l.c.d. channel display, d.c. power cable, mounting bracket supplied
REVIEWED:
PRICE: £160*

WIN 108

TYPE: hand-held
COVERAGE: 108-135.975MHz
MODES: a.m.
SENSITIVITY: 0.5µV @ 12dB SINAD
SELECTIVITY: -59dB @ 25kHz
RESOLUTION: 25, 50kHz
IMAGE REJECTION: -55dB
IF STAGE: 10.7MHz, 455kHz
AUDIO OUTPUT: 320mW at 10% t.h.d
SCAN RATE: 10 channels per second
SEARCH RATE: 5 seconds per MHz at 25kHz steps
MEMORIES: 20
FEATURES: priority channel, display/hold, channel lockout, keyboard lock, external power and speaker jacks, display lighting
REVIEWED: Short Wave Magazine December 1988 (£1.65 back issue)
PRICE: £179

Uniden Bearcat 580XLT

TYPE: mobile/base station
COVERAGE: 29-54, 118-174, 406-512MHz
MODES: a.m., f.m.
SENSITIVITY: h.f. & v.h.f. = 0.4µV, u.h.f. = 0.5µV all @ 12dB SINAD
SELECTIVITY: -55dB @ 25MHz
RESOLUTION: 5, 10, 12.5kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 2.5W @ 10% t.h.d.
SCAN RATE: 15 channels per second
SEARCH RATE:
MEMORIES: 100
FEATURES: 2 second delay, lockout, priority scan
REVIEWED:
PRICE: £199*

Sony AIR-7

TYPE: hand-held
COVERAGE: 150kHz-2.19MHz, 76-136, 144-174MHz
MODES: a.m., w.b f.m., n.b f.m
SENSITIVITY: f.m. = 2µV @ 20dB S/N, airband = 1.25µV @ 12dB SINAD, 144-174MHz = 0.5µV @ 12dB SINAD
SELECTIVITY:
RESOLUTION: 5, 9, 10, 25 or 50kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 400mW into 8Ω
SCAN RATE:
SEARCH RATE:
MEMORIES: 10
FEATURES: key protect, backlit l.c.d. readout, priority channe
REVIEWED: Practical Wireless November 1986 (85p photocopy)
PRICE: £229

Revco RS-3000

TYPE: base statio
COVERAGE: 26-3[illegible]90, 118-180, 380-512MHz
MODES: a.m.
SENSITIVITY: [illegible]v.h.f. = 0.5µV, airband & u.h.f. = 1µVboth 10d[illegible]
SELECTIVITY:
RESOLUTION: 5, 12.5, 25kHz
IMAGE REJECTION:
IF STAGE: 21.4MHz, 455kHz
AUDIO OUTPUT: 1.5W @ 10% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 50
FEATURES: compact size, l.c.d. readout, priority memory channel
REVIEWED: Short Wave Magazine June 1988 (£1.60 back issue)
PRICE: £199.00*

Realistic PRO-2021

TYPE: base/mobile
COVERAGE: 68-88, 108-136, 138-174, 380-512MHz
MODES: a.m., f.m.
SENSITIVITY: 66-88MHz, 138-174MHz & 380-512MHz = 1µV, 108-136MHz = 2µV
SELECTIVITY: -6dB @ ±9kHz, -50dB @ ±15kHz
RESOLUTION: 5, 12.5 & 25kHz
IMAGE REJECTION:
IF STAGE: 10.7MHz, 455kHz
AUDIO OUTPUT: 300mW
SCAN RATE: 4 or 8 channels per second
SEARCH RATE:
MEMORIES: 200
FEATURES: Squelch control, mobile mounting bracket included, sockets for external antenna, speaker and tape socket
REVIEWED: Short Wave Magazine August 1988 (85p photocopy)
PRICE: £220*

AOR AR800E

TYPE: hand-held
COVERAGE: 75-105, 118-136, 140-174, 406-495, 830-950MHz
MODES: a.m., f.m.
SENSITIVITY: 75-105, 118-136 & 140-174MHz = 0.4µV; 406-495MHz = 0.5µV; 830-950MHz = 1µV all @ 12dN SINAD; 118-136MHz a.m. = 0.8µV @ 10dB S/N
SELECTIVITY: -23dB @ ±12.5kHz, -45dB @ ±25kHz
RESOLUTION: 5, 10, 12.5kHz (v.h.f.), 12.5kHz (u.h.f.), 25kHz (offset by 12.5kHz) on 830-950MHz
IMAGE REJECTION: -24dB @ 145MHz
IF STAGE: 21.4MHz, 455kHz
AUDIO OUTPUT: 140mW at 10% t.h.d.
SCAN RATE: 13 channels per second
SEARCH RATE: 7.5 seconds per MHz at 12.5kHz steps
MEMORIES: 20
FEATURES: NiCad battery pack and charger supplied, two helical antennas, illuminated l.c.d. readout and delay/hold function
REVIEWED:
PRICE: £169

Kenwood RZ-1

TYPE: base/mobile station
COVERAGE: 500kHz-905MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: a.m. = 5µV @ 10dB S/N, n.b.f.m. = 6µV @ 12dB SINAD, 60-905MHz = 3µV, w.b.f.m. = 1µV
SELECTIVITY:
RESOLUTION: 5, 12.5, 20, 25kHz
IMAGE REJECTION:
IF STAGE: 45.75, 10.7MHz
AUDIO OUTPUT: 2W into 8Ω @ 5% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 100
FEATURES: text store feature, picture symbols available on display
REVIEWED: Short Wave Magazine April 1988 (£1.65 back issue)
PRICE: £459

Sony ICF PRO-80

TYPE: hand-held
COVERAGE: 150kHz-108MHz (115.15kHz - 223MHz using FRG-80 converter)
MODES: w.b.a.m., n.b.a.m., f.m., n.b.f.m., s.s.b.
SENSITIVITY: l.w. & m.w. = 42dBµV, f.m. = 9dBµV 30dB S/N
SELECTIVITY: ±3.8kHz @ 50dB, ±400kHz @ 58dB for f.m.
RESOLUTION: 3, 5, 10, 50kHz plus fine tune
IMAGE REJECTION: 77dB (l.w., m.w., s.w., v.h.f.), 40dB (f.m.)
IF STAGE: 55.845MHz, 455kHz, 10.7MHz (f.m.)
AUDIO OUTPUT: 400mW at 10% t.h.d.
SCAN RATE:
SEARCH RATE
MEMORIES: 40
FEATURES: converter supplied, soft case, shoulder belt, frequency handbook, key protect facility, fine tune control
REVIEWED: Short Wave Magazine March 1988 (£1.65 back issue)
PRICE: ££299

Signal R-535

TYPE: base station
COVERAGE: 108-142 995, 220-379.995MHz
MODES: a.m.
SENSITIVITY: v.h.f. = 0.32µV, u.h.f. = 0.46µV both for 12dB SINAD
SELECTIVITY: ±25kHz @ 55dB
RESOLUTION: 5, 10, 25, 50, 100kHz (v.h.f.); 25, 50, 100, 500kHz, 1MHz (u.h.f.)
IMAGE REJECTION: v.h.f. = >-55dB, u.h.f. = >-25dB
IF STAGE: 21.4MHz, 455kHz
AUDIO OUTPUT: 360mW into 8Ω
SCAN RATE: 12 channels per second
SEARCH RATE: 2.5 seconds per MHz in 25kHz steps
MEMORIES: 60
FEATURES: connection of RS232 interface possible andportable operation available
REVIEWED:
PRICE: £254

Uniden Bearcat 100XLT

TYPE: hand-held
COVERAGE: 29-54, 118-174, 406-512MHz
MODES: a.m., f.m.
SENSITIVITY: h.f. = 0.4µV, v.h.f. = 0.8µV, u.h.f. = 0.5µV
SELECTIVITY: ±25kHz @ 55dB
RESOLUTION: 5, 10, 12.5kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 480mW
SCAN RATE: 15 channels per second
SEARCH RATE: 25 frequencies per second
MEMORIES: 100
FEATURES: antenna, earpiece, a.c. adapter included
REVIEWED:
PRICE: £225*

Bearcat 210XW

TYPE:
COVERAGE: 30-50, 136-174, 406-512MHz
MODES: f.m.
SENSITIVITY: 30-50 & 136-174MHz = 0.3µV, 406-512MHz = 0.5`V
SELECTIVITY: ±25kHz @ 55dB
RESOLUTION: 5kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 1.5W r.m.s. into 8Ω @ 10% t.h.d
SCAN RATE:
SEARCH RATE:
MEMORIES: 20
FEATURES: lockout facility, delay funcion,telescopic antenna supplied
REVIEWED
PRICE: £169*

Bearcat 800XLT

TYPE: mobile/base station
COVERAGE: 29-54, 118-174, 406-512, 806-912MHz
MODES: f.m
SENSITIVITY: 29-54 & 136-174MHz = 0.3µV, 118-136MHz = 0.8µV, 406-512MHz = 0.5µV, 840-912MHz = 0.7µV
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION: 5, 12.5, 25kHz
IMAGE REJECTION
IF STAGE:
AUDIO OUTPUT: 1.5W @ 10% t.h.d.
SCAN RATE: 15 channels per second (rapid)
SEARCH RATE: 15 frequencies per second
MEMORIES: 40
FEATURES: priority channel, scan delay, direct channel access and channel lockout
REVIEWED: Short Wave Magazine March 1989 (£1.65 back issue)
PRICE: £257*

Icom IC-R1

TYPE: hand-held
COVERAGE: 100kHz-1.3GHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: a.m. = 1.6µV (2-25MHz) 0.79µV (25-905MHz) for 10dB S/N; n.b.f.m. = 0.79µV (2-25MHz) 0.4µV (25-905MHz) w.b.f.m. = 6.3µV (2-25MHz) 3.16µV (25-905MHz) for 12dB SINAD
SELECTIVITY: a.m. more than 15kHz/-6dB, n.b.f.m. more than 15kHz/-6dB, w.b.f.m. more than 150kHz/-6dB
RESOLUTION: 0.5, 5, 8, 9, 10, 12.5, 15, 20, 25, 30 or 50kHz
IMAGE REJECTION:
IF STAGE: 266.7000-266.7095MHz, 10.7MHz, 455kHz
AUDIO OUTPUT: 150mW @ 10% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 100
FEATURES: multi-scan function, built-in S-meter, built-in clock with timer
REVIEWED: Practical Wireless July 1990 (£1.65 back issue)
PRICE: £359

Standard AX700

TYPE: base/mobile
COVERAGE: 50-904.995MHz
MODES: a.m., w.b.f.m., n.b.f.m
SENSITIVITY: a.m. = 3µV @ 10dB S/N, n.b.f.m. = 1.5µV, w.b.f.m. = 1µV both for 12dB SINAD
SELECTIVITY
RESOLUTION: 1, 5, 10, 12.5, 20, 25kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: more than 1.8W in 8Ω @ 10% t.h.d
SCAN RATE
SEARCH RATE
MEMORIES: 100
FEATURES: telescopic antenna supplied, l.c.d. readout, backlit dsiaply, spectral display
REVIEWED
PRICE: £545

WHAT SCANNER

Icom IC R7000HF

TYPE: base station
COVERAGE 25-999.999, 1025-1999.999MHz
MODES a.m., f.m, s.s.b
SENSITIVITY 25-999 999MHz n.b.f.m >0.5µV, f.m. >1.0µV both for 12dB SINAD; a.m. >1.0µV for 10dB S:N, s.s.b. >0.3µV both for 10dB S N
SELECTIVITY: f.m., a.m. = 7.5kHz @ -6dB, n.b.f.m. = 3kHz @ -6dB, f.m. 75kHz @ -6dB, s.s.b. = 1.4kHz @ -6dB
RESOLUTION: 100Hz min
IMAGE REJECTION: <60dB
IF STAGE 778.7 or 226.7, 10.7MHz, 455kHz
AUDIO OUTPUT 2.5W
SCAN RATE: 2 or 7 channels per second
SEARCH RATE: not given
MEMORIES 100
FEATURES
REVIEWED Short Wave Magazine December 1989 (£1.65 back issue)
PRICE: £895*

Uniden Bearcat UBC200XLT

TYPE: hand-held
COVERAGE 66-88, 118-174, 406-512, 806-956MHz
MODES a.m., f.m
SENSITIVITY: 66-88 & 406-512MHz = 0.3µV, 118-136 & 806-956MHz = 0.6µV, 136-174MHz = 0.4µV
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION 5kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: 500mW max
SCAN RATE: 15 channels per second
SEARCH RATE: 25 frequencies per second
MEMORIES: 200
FEATURES: memory back-up, priority scan, l.c.d. readout, lockout
REVIEWED
PRICE: £229.00

Bearcat 100FB

TYPE hand-held
COVERAGE 66-89, 138-174, 406-512MHz
MODES: f.m
SENSITIVITY 66 - 88 & 138 - 174MHz = 0.6µV; 406-512MHz = 1µV both @ 12dB SINAD
SELECTIVITY: 50dB @ ±25kHz
RESOLUTION 5 & 12.5kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: 300mW
SCAN RATE: 15 channels per second
SEARCH RATE: 15 channels per second
MEMORIES: 16
FEATURES: low battery warning lamp and lockout facility
REVIEWED: Practical Wireless September 1982 (reprint available @ 85p)
PRICE: £253 when new, now second-hand

Uniden Bearcat BC590XLT

TYPE mobile
COVERAGE 29-54, 118-174, 406-512MHz
MODES. a.m., f.m.
SENSITIVITY. 29-54 & 136-174MHz = 0.4µV, 118-136MHz = 0.8µV, 406-512MHz = 0.5µV
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION 5kHz min
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT 2.5W @ 10% t.h.d
SCAN RATE: 15 channels per second
SEARCH RATE
MEMORIES 100
FEATURES: lockout, telescopic antenna included
REVIEWED
PRICE: £199 00*

ASA AIR PRO II

TYPE: hand-held
COVERAGE: 520kHz-1.65MHz, 88-108, 118-136, 162.5MHz
MODES: a.m., f.m.
SENSITIVITY: a.m. = 4.7mV/m @ 20dB SINAD, f.m. = 4µV
SELECTIVITY: a.m. = 10dB, f.m. = 25dB
RESOLUTION:
IMAGE REJECTION: a.m. = 25dB, f.m. = 20dB
IF STAGE:
AUDIO OUTPUT: 170mW
SCAN RATE:
SEARCH RATE:
MEMORIES:
FEATURES: l.c.d. readout, external power supply port
REVIEWED:
PRICE: £60*

Fairmate HP-100E MkII

TYPE. hand-held
COVERAGE 8-600, 830-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY 8-550, 805-1300MHz less than 0.5µV for 12dB SINAD, 25-550MHz a.m. less than 2µV, w.b.f.m. less than 3µV
SELECTIVITY
RESOLUTION 5-995kHz selectable
IMAGE REJECTION
IF STAGE: 561.225, 58 075MHz, 455kHz
AUDIO OUTPUT over 100mW for 10% t.h.d
SCAN RATE:40 channels per second
SEARCH RATE
MEMORIES: 1000
FEATURES: NiCads, two antennas, carry case, shoulder strap, belt clip, d.c. cable and earpiece provided
REVIEWED Short Wave Magazine February 1990 (£1.65 back issue)
PRICE: £ 299 00

Icom IC-R9000

TYPE: base station
COVERAGE: 100kHz - 1.9998GHz
MODES: a.m., n.b.f.m., w.b.f.m., s.s.b., f.s.k., c.w
SENSITIVITY: 100-500kHz = 0.5µV s.s.b., c.w., f.s.k 3.2µV a m.; 500kHz-1.799MHz = 1.0µV a.m. 6.3µV; 1.8-29.999MHz = s.s.b., c.w., f.s.k. 0.16µV a.m. 1.0µV,30-999.99MHz = s.s.b., c.w., f.s.k. 0.32µV, a.m. 1.4µV n.b.f.m. 0.5µV w.b.f.m. 1.4µV; 1-1.2399GHz = s.s.b., c.w., f.s.k. 0.63µV a.m. 4.0µV n.b.f.m. 1.0µV w.b.f.m. 4.0µV; 1.24-1.2999GHz = s.s.b., c.w., f.s.k. 0.32µV a.m. 2.0µV n.b.f.m. 0.5µV w.b.f.m. 2.0µV; 1.3-1.5999GHz = s.s.b., c.w., f.s.k. 0.63µV a.m. 4.0µV n.b.f.m. 1.0µV w.b.f.m.4.0µV; 1.6-1.9998GHz=s.s.b., c.w., f.s.k. 1.0µV a.m. 5.6µV n.b.f.m. 1.4µV w.b.f.m. 5.6µV
SELECTIVITY: s.s.b., c.w. f.s.k. = more than 2.4kHz/-6dB; a.m. = more than 6kHz/-6dB; n.b.f.m. = more than 15kHz/-6dB; w.b.f.m. = more than 150kHz/-6dB
RESOLUTION: not known
IMAGE REJECTION
IF STAGE: 48.79376-48.8, 776.60001-778.7, 278.60001-278.7, 10.7MHz, 455kHz
AUDIO OUTPUT: more than 2.5W into 8Ω @ 10% t.h.d
SCAN RATE:
SEARCH RATE
MEMORIES
FEATURES
REVIEWED: Short Wave Magazine April 1989 (£1.65)
PRICE: £3995 00

Icom IC-R100

TYPE: mobile/base station
COVERAGE: 100kHz-1.856GHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: 500kHz-1.6295MHz = a.m. 3.2µV; 1.63-49.9995MHz = a.m. 1.6µV n.b.f.m. 0.56µV; 50-904.9995MHz = a.m. 0.56µV n.b.f.m. 0.2µV w.b.f.m. 0.63µV; 905-1380.4875MHz=a.m. 1.0µV n.b.f.m. 0.32µV w.b.f.m. 0.79µV; 1.3805-1.8GHz = a.m. 1.4µV n.b.f.m. 0.45µV w.b.f.m. 1.1µV
SELECTIVITY: a.m. = more than 6kHz/-6dB, n.b.f.m. = more than 15kHz/-6dB, w.b.f.m. = more than 180kHz/-3dB
RESOLUTION: 1, 5, 8, 10, 12.5, 20, 25kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: more than 2.5W at 10% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 100
FEATURES:
REVIEWED:
PRICE: £485

Realistic PRO-2005

TYPE: base station
COVERAGE: 25-520, 760-1300MHz
MODES: a.m., n.b.f.m., w.b.f.m.
SENSITIVITY: w.b.f.m. 25-520 & 760-1100MHz = 3µV, 1100-1300MHz = 10µV; n.b.f.m. 25-520 & 760-1100MHz = 0.5µV, 1100-1300MHz = 3µV; a.m. 25-520 & 760-1100MHz
SELECTIVITY: n.b.f.m. & a.m. = ±9kHz -6dB, ±15kHz -50dB, w.b.f.m. = ±150kHz -6dB, ±300kHz -50dB
RESOLUTION 5kHz min
IMAGE REJECTION 610MHz @ 70MHz 60dB, 608MHz @ 1000MHz 60dB
IF STAGE
AUDIO OUTPUT 1.3W
SCAN RATE 8 or 16 channels per second
SEARCH RATE: 8 or 16 frequencies per second
MEMORIES: 400 permanent, 10 temporary
FEATURES:
REVIEWED: Short Wave Magazine September 1989 (£1.65 back issue)
PRICE: £340*

Uniden Bearcat UBC50XL

TYPE: hand-held
COVERAGE: 66-88, 136-174, 406-512MHz
MODES: a.m., f.m.
SENSITIVITY: 66-88MHz = 0.4µV, 136-174 & 406-512MHz = 0.7µV all for 12dB SINAD
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION:
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT. 400mW into 8Ω
SCAN RATE: 10 channels per second
SEARCH RATE:
MEMORIES: 10
FEATURES: low battery indicator, memory back-up, lockout
REVIEWED:
PRICE: £100*

Regency MX7000

TYPE Base station
COVERAGE. 25-550, 800-1300MHz
MODES a.m., n.b.f.m., w.b.f.m.
SENSITIVITY. n.b.f.m. = 0.4µV, w.b.f.m. = 1.0µV both @ 12dB SINAD; a.m. = 0.8µV @ 10dB s/n
SELECTIVITY: n.b.f m. ± 7.5kHz, w.b.f.m. = ±5-kHz, a.m. = ±5kHz all @ 6dB
RESOLUTION: 5, 12.5 & 25kHz
IMAGE REJECTION: -50dB
IF STAGE. 750, 45.03, 5.5, 455kHz
AUDIO OUTPUT: 1W @ 10% t.h.d.
SCAN RATE. 5 channels per second
SEARCH RATE: 6 seconds per MHz
MEMORIES 20
FEATURES: tuning dial as well as keypad, priority channel, mains adapter and mounting bracket available as extras
REVIEWED
PRICE: £399*

AOR AR-3000

TYPE: base station
COVERAGE 100kHz 2 036GHz
MODES: a.m., n.b.f.m., w.b.f.m., s.s.b., c.w
SENSITIVITY: 100kHz-2.5MHz s.s.b., c.w. = 1.0µV a.m. = 3.2µV; 2.5MHz-1.8GHz s.s.b., c.w. = 0.25µV, a.m. = 1.0µV, n.b.f.m. = 0.35µV, w.b.f.m. = 3.0µV; 1.8-2GHz s.s.b., c.w. = 0.75µV, a.m. = 3.0µV, n.b.f.m. = 1.25µV, w b.f.m = 3.0µV
SELECTIVITY: s.s.b. & c.w. = 2.4kHz/-6dB 4.5kHz/-60dB; a.m. & n.b.f.m. = 12kHz/-6dB, 25kHz/-70dB; w.b.f.m. = 180kHz/-6dB, 550kHz/-50dB
RESOLUTION
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: 1.4W into 4Ω 10% t.h.d., 0.7W into 8Ω 10% t.h.d
SCAN RATE: 20 channels per second
SEARCH RATE 20 steps per second
MEMORIES 400
FEATURES
REVIEWED: Short Wave Magazine January 1990 (£1 65 back issue)
PRICE: £765.00

Uniden Bearcat UBC760XLT

TYPE: mobile/base station
COVERAGE: 66-88, 108-174, 350-512, 806-956MHz
MODES: a.m., f.m.
SENSITIVITY: 66-88MHz = 0.3µV, 136-174 & 406-512MHz = 0.4µV, 108-136MHz = 0.6µV, 806-956MHz = 0.8µV
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION:
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 2W @ 10% t.h.d.
SCAN RATE: 15 channels per second
SEARCH RATE:
MEMORIES: 100
FEATURES: backlit controls, options include signal booster pre-amplifier, CTCSS tone squelch decoder
REVIEWED:
PRICE: £235.00

AOR AR900

TYPE hand-held
COVERAGE: 108-174, 220-380, 406-470MHz, 830-950MHz
MODES a.m., f.m
SENSITIVITY: 0.4µV v.h.f. hi & lo, 0.8µV v.h.f. air, 0.5µV u.h.f., 1µV 800MHz
SELECTIVITY
RESOLUTION: 5, 10, 12.5, 25kHz
IMAGE REJECTION
IF STAGE
AUDIO OUTPUT: 120mW @ 10% t.h.d.
SCAN RATE: 15 channels per second
SEARCH RATE.
MEMORIES: 100
FEATURES: supplied with NiCads, mains powered charger, two flexible antennas
REVIEWED
PRICE: £199

Cobra SR925

TYPE: base station
COVERAGE: 29-54MHz, 118-174MHz, 406-512MHz
MODES:
SENSITIVITY: 0.3µV @ 29-54 & 136-174MHz, 0.5µV @ 406-512MHz, 0.7µV @ 118-135.975MHz
SELECTIVITY: -55dB @ ±25kHz
RESOLUTION: 25kHz
IMAGE REJECTION:
IF STAGE:
AUDIO OUTPUT: 1W into 8Ω at 10% t.h.d.
SCAN RATE:
SEARCH RATE:
MEMORIES: 16
FEATURES:
REVIEWED: Short Wave Magazine April 1990 (£1.65 back issue)
PRICE: £150*

International Scanning in the UHF Bands

David Simpson

Unless you happen to live very close to the borders of another country 'International Scanning at u.h.f.' sounds almost like a contradiction in terms. The very characteristics which make v.h.f. and u.h.f. so conveniently re-useable, by definition make it impossible to listen to what is happening on those channels more than 50 or so miles away.

Yes, I know that there are many fellow listeners who will claim QSLs from much greater distances, but some of us like to listen to the sort of action channels that are not famed for long distance propagation. Police, fire, utility channels have their devotees on both sides of the Atlantic it seems.

And even in the relatively close confines of multi-national Western Europe, language barriers limit any truly international scanning possibilities.

On top of all that, regulations in most countries place restriction on what you may, or more often may NOT, listen to!

As a keen scanner user and regular subscriber to a number of periodicals and magazines, I read every month about the USA and what frequencies and equipment is in use. Readers in the USA may be surprised that details which are regarded as being in the public domain in the States are seen quite differently and often restricted by law in other countries. To see frequency information in print, freely available and published in magazines would bring *angst* to most bureaucrats in Europe.

I was keen to hear some of the station based in places which were only names on a map, or at best, seen in the movies.

A trip to California was too good an opportunity to miss. But how was I going to be able to fulfil this ambition to hear local telecommunications channels?

The cost of buying equipment locally to use for a short period ruled out that possibility and scanners are not the sort of thing you can rent from Hertz (however appropriate it sounds!).

There was nothing else for it. Somehow I would have to take a scanner with me from the UK.

Dangerous Cargo?

Six hours before the flight is due to depart from London's Heathrow airport to San Francisco is hardly the time to be agonising on whether you ought to take a scanner with you!

I was aware that certain states have anti-scanner laws but my understanding was that California is reasonably liberal. Perhaps another contributor inthe US might write an article on which states permit scanners and which don't.

The increased problems of security on all flights has got to be a very important consideration. My carrier to the West Coast was to be Pan-Am which, since the Lockerbie disaster is now reputedly one of the most security conscious at London's Heathrow, and almost as rigourous as the legendary El Al. Clearly there would only be one way to find out whether a scanner scheduled for the most innocent and inoffensive of uses could make its way past security. Would I be targetted as a potential terrorist? Might it look too much like a walkie-talkie ready to be used to co-ordinate some diversion to a Middle East destination? I would soon find out.

What about bringing the unit back into the UK? Customs people see all sorts of strange items, but I did not really fancy going through any sort of long and complex explanation - leading may be to the confiscation of my scanner. Would I be allowed to take it into the USA? Attempts to check with Her Majesties' Customs and Excise department by telephone the evening before leaving proved impossible and so the decision had to be made to 'try it and see'.

Old Faithful

The next decision was a little easier. The Icom R7000 is not made for portability and for that reason is virtually built in to the monitoring post. An RS3000, which may not be familiar to American readers but which incorporates a.m., essential for listening to UK mobile systems could be used inthe rental car, as could the Yaesu FRG-9600. Both were rejected on the grounds of being less adaptable than a hand-portable.

The next decision...which hand-held unit?

A newly acquired Fairmate HP100 (which appeared in the US as the AR1000) seemed to present too much in the way of potential trouble at the Customs posts, despite the attraction of 1000 memories and a coverage of 25-1300MHz! I could not bear the possibillity that this unit might be impounded at Customs either on the way out or re-entering the UK.

Only one option was left open to me. The old faithful Bearcat UBC100XL distributed by Uniden, Belgium, and apparently adapted for the European market, has only 16 memories and a limited frequency coverage. It might not win prizes for sensitivity, performance and coverage but conversly a temporary impounding by the authroities would be less financially damaging as it is now several years od.

Much of Europe uses the band 66-87MHz for mobile radio services and the UBC has that band together with the airbands (which it switches to a.m. automatically), the v.h.f. band 136-174MHz and 406-512MHz u.h.f. As an aside, the majority of mobile services on the 66-87MHz bands inthe UK use a.m., so the UBC100XL is really only suitable for the other three bands listed.

My interest as already stated is mainly in the utilities channels which I felt would be adequately covered by the Bearcat and knowing the USA to be predominately f.m., the choice was made.

Don't attract attention

At the airport the security was reassuringly extensive, but not inconveniently so. The Bearcat got no more that a cursory glance from the first stage of Pan-Am security. So far so good.

It was spotted in my hand baggage on the X-Ray machines at the second stage. I was asked to switch it on, which brought up the l.c.d. and seemed to satisfy the security requirement.

I had expected it to be asked to surrender it during the flight; this has happened to me on domestic UK flights in the past when carrying two-way radio rquipment. In any event I had no intention of using it in flight. We Brits do tend to be more reserved than our American cousins and don't usually like to attract attention to ourselves by doing anything out of the 'ordinary' and quite apart from anything else, I am very conscious of the possibilities of local oscillator interference to sensitive aeronautical systems.

Through to the departure lounge without incident.

I had plenty of time before boarding and sought out the UK customs desk which is

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Memories: 1984 (64 x 32)
Search bands: 16
Search/scan speed: Upto 36 channels or increments per second
Aerial input: 50 OHM BNC
Size: 150 x 55 x 180 mm
Weight: 650g

☆AR2800
Coverage: 500kHz - 600MHz & 800-1300MHz
Channel steps: Programmable in 5 & 12.5kHz upto 995kHz
Modes: AM, FM(N),FM(W), SSB, CW
Power: 11 - 16V DC
Memories: 1000 (100 x 10)
Search bands: 10
Search/scan speed: Upto 20 channels or increments per second
Aerial input: 50 OHM BNC
Size: 150 x 55 x 180 mm
Weight: 1050g

AR2500 R.R.P. £419.00 inc. VAT
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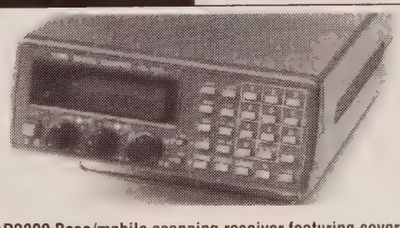

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Access

International Scanning in the UHF Bands

there really to assist non-EEC visitors to recover local taxes paid whilst in Britain. I explained to the helpful young customs officer that I did not relish the possibility of spending my first few hours back in England arguing that UK tax had already been paid on my equipment; I could foresee difficulties in explaining what the equipment might be used for, etc.

He understood my reasoning and wanted to see the scanner. Was it the sort of thing that you could listen to the pilots of aircraft, he asked. The easiest thing to do was agree that it could be used for exactly that.

In that case he could see no problem in bringing the equipment back into the country, and went to find a colleague to confirm his judgement. How long had I owned it, the older customs officer wanted to know, and how much was it worth?

Finally, they agreed that I shouldn't have any problems bringing it back into the UK.

They obviously felt the same way I did about the vagueness of this guarantee and clearly shared my belief in the old law that 'waht can go worng, will'. Paul, the young customs officer, and I took the precaution of exchanging details so that he could vouch that the scanner was mine, in case I should get arrested for illegal importation!

It may not be elegent but it works

Within hours of arriving in wonderful San Francisco, I was spotting SFPD cars with u.h.f. antennas and also high gain antennas which I suspected were for 850MHz data systems.

At the first opportunity, having remembered to bring the deaf-aid type earpiece to minimise irritation to my travelling companion, I searched around the standard u.h.f. bands at 450/460MHz.

Lots of interesting traffic, although the often-cited 'two nations divided by a common language' came to mind as I tried to listen to West Coast accents talking rather quickly in jargon and radio short-hand. How could I tell what I was listening to? The easy familiarity of listening through the channels is jarred by lack of knowledge of geography, callsigns and all the other characteristics that are second nature on home ground.

At first it seemed that it could be impossible to find out 'who's who' in the limited time available. I did not know the solution to this problem.

I had a bigger concern. The NiCad batteries inthe Bearcat would not last forever, and of course the UK has a 240V supply system whereas the USA uses 110V. I knew before leaving the UK that having no 110V battery chargr meant that I would have to make some other arrangements. Users of the Bearcat 100XL will know that there is a small plastics cover to the battery compartment held on by two small screws. Long ago these on my unit had become worn and the battery cover distorted so I was very disinclined to undo the panel and allow the use of throw-away batteries. I would reserve that possiblity 'till the last possible moment.

Could I find an answer to both my problems? The Bay Area *Yellow Pages* were not hugely helpful in locating a scanner dealer or a Uniden agent in San Francisco. Where were all the scanner dealers I had expected to find in that great conurbation?

A visit to the only Uniden dealer I could find in the San Francisco area was a little disappointing. Perhaps my expectations were too great, but I found a relatively small selection of scanning equipment in a shop which was more geared to CB and computer games. Maybe specialist stores exist and admittedly my time available prevented me from exploring into the more distant suberbs. I don't see any adverts in magazines such as *Monitoring Times*, and I couldn't locate a scanner store in Los Angeles.

I did, however, find the answers to my problems at the same store. I figured that the charging adaptor provided with the Bearcat gives 12V d.c. so I bought a connector lead to power the Bearcat from the cigar-lighter in the car. Even as I write that I can hear pens going to paper while purists get ready to tell me that ten good reasons why this should not be done. Incidentally, the Uniden dealer that I bought the lead from knew what I planned to use it for, but admitted that he did not know whether it would work or not.

My innocent reply is *that it works*.

My other purchase was *The Bay Area Scanner Book* published by the Base Station Inc, 1839 East Street, Concord, CA 94520. It is easy to use and well laid out; without it I would have taken me months, even if I had ever thought to listen around 488MHz where most of the action is, especially since the UK mobile radio bands finish at 470MHz. Besides, the listing even told me the right channels to listen to in my part of town, and lots more. Its only shortcoming for me was that it did not also cover my next port of call, i.e. the Los Angeles area. Well, in fairness it *is* called The Bay Area Scanner Book.

After that my main problem, of course, was deciphering what was being said and which callsign referred to what. Just the same problem as going to a different area inthe UK for the first time except that no similar frequency listings exist in the UK, since it is an offence under the Wireless Telegraphy Act to listen to transmissions for which the receiver is unlicensed - in practical terms, anything except broadcast, CB and amateur bands.

It was also quite amazing for a UK visitor to see the enormous amount of radio equipment around and things like the radio tower (Mt Sutro?); structures of that height are generally broadcast stations in this country and I would be interested to know what it is used for.

One other sight disappointment was that frequency limitations of the European Bearcat prevented me from listening to the famous California Highway Patrol (CHP), who utilise the 40MHz band (presumably to compensate for the terrain and distances between centres of population).

The whole experience was fascinating, and left me wondering whether any other readers had taken scanners on an international trip? Some enterprising body might arrange to hire scanners, who knows? In any case, I hope that these notes will be of assistence to anyone plainning to do the same thing.

Did I have any problem re-entering the UK with my scanner? Not a bit. Nobody asked about it at all.

Would I do it again?

I can hardly wait and the first thing I'll buy is the local frequency list!

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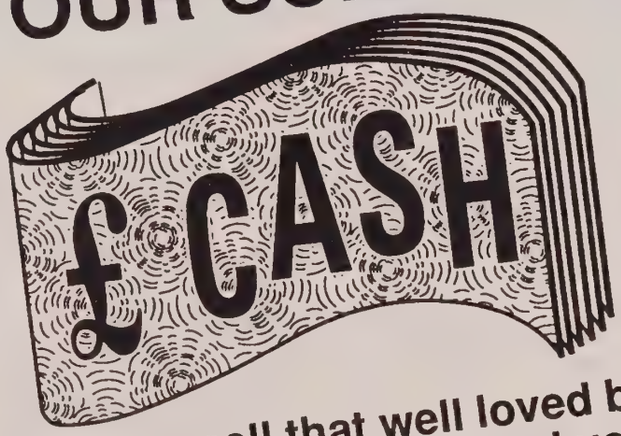

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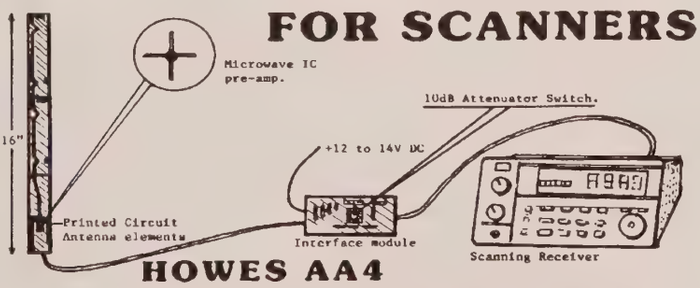

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73 from Dave G4KQH, Technical Manager.

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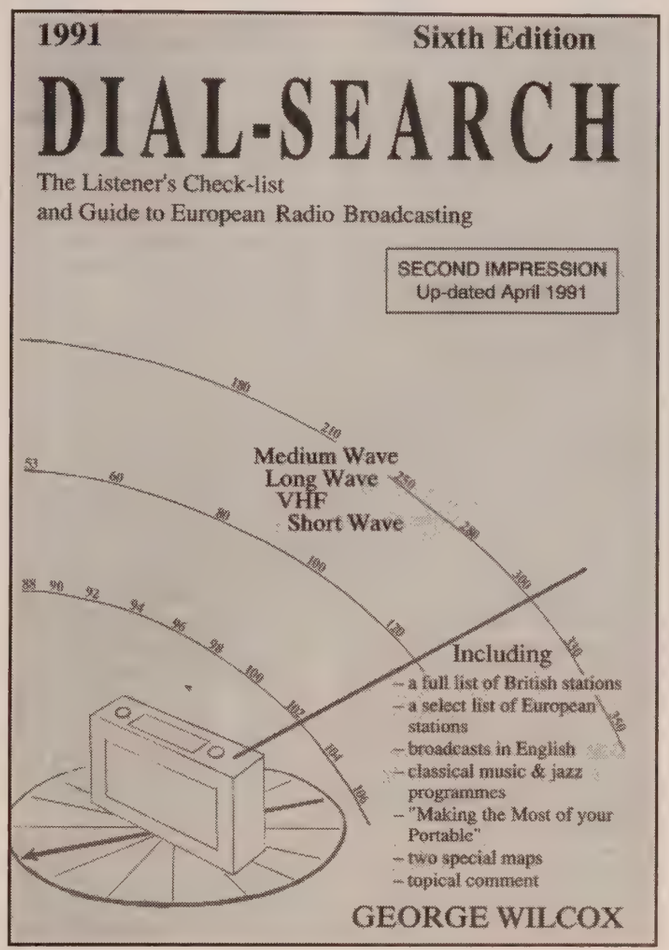

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Faraday, Greyfriars, Storrington, West Sussex RH20 4HE.

It soon became obvious reading the reports I received, from astronomers and radio enthusiasts, that the sun was very active in August. **Clive Brook** (Plymouth), using a tripod-mounted refractor telescope with a projection box and screen, counted 12 sunspots and 2 groups on the 3rd; 10s/2gps on the 4th; 7s/4gps on the 8th; 3s/2gps on the 10th; 6s/4gps on the 12th; 21s/4gps on the 16th; 26s/5gps on the 18th; 34s/4gps on the 21st; 33s/5gps on the 22nd; 14s/4gps on the 26th; 12s/4gps on the 27th; 12s/4gps on the 28th; 22s/4gps on the 29th; 22s/6gps on the 30th and 24s/6gps on the 31st.

At his observatory in Bristol, **Ted Waring** counted 56 sunspots on the 18th and 22 on the 26th. In Sevenoaks, **Cmdr Henry Hatfield**, using his spectrohelioscope, located 2gps, 14 filaments, 6 quiescent prominences and 'a medium to large anvil shaped prom.' on the east limb at 1412 on the 12th; a similar report but the 'anvil prom' had gone on the 13th; a chain of 23s/10fs/5qps/2 small very bright plages and a thin filament at 1117 on the 16th; similar conditions plus a small flare at the east end of the long chain at 1410 on the 18th, 55s/24fs/9 small qps at 1425 on the 19th; 55s/17fs/13qps at 1045 on the 21st; 2gps/17fs/13 qps/a small loop prominence on the east limb at 1115 on the 26th; 3gps/24fs/13qps/2 small hot spots at 1130 on the 29th; 4gps/19fs/9qps at 1425 on the 30th and the same except for 8 less filaments at 0945 on the 31st.

Despite a very hazy sun, when small groups and spots could have been missed, **Patrick Moore** (Selsey) made a drawing, **Fig. 1**, of the groups and spots he was able to project at 1140 on the 5th and again at 1030 on the 10th, **Fig. 2**.

Fig. 1.

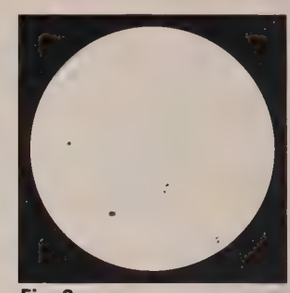

Fig. 2.

Solar Noise & Effects

Henry Hatfield's radio telescope recorded, on a paper chart, individual bursts of solar noise, at 136MHz, on days 16, 20 and 26 and at 1297MHz on the 20th. **Ern Warwick** (Plymouth) periodically heard the 'hissing' or 'whoOOoshing' of solar noise, around 28MHz, on days 2, 4, 13 and 21. **Fred Pallant** (Storrington) reported a, 'high level of solar noise all day', on the 19th.

With this sort of activity, it was no surprise to learn that Ern Warwick found the 28MHz band 'dead', at times, on days 3, 4, 5, 6, 9, 11, 17, 19 and 23. Fred's comment for the 27th and 28th was, "Two very 'quiet' days - like someone has stolen the ionosphere". The extent of the 'blackout' on the 6th is clearly seen in **Fig. 3**.

Gordon Foote (Abingdon) and Ern Warwick, between them, heard one of the German propagation beacons, DK0WCY on 10.144MHz, giving auroral warnings at various times on days 2, 3, 4, 11, 12, 14 and 15.

Sporadic-E

Reference to the Band I (48-68MHz) section of 'dxtv roundup', elsewhere in this issue, will show that varying spells of Sporadic-E were observed almost daily throughout August. Long periods were observed by **Bob Brooks** (Great Sutton) on the 4th, 7th and 13th.

I counted at least 24 East European f.m. broadcast stations between 66 and 73MHz at 1955 on the 24th. **Andrew Jackson** (Birkenhead) heard stations, most likely from Germany, Italy and Yugoslavia, between 99 and 103MHz on the 15th.

Propagation Beacons

First, my thanks to **Chris van den Berg** (The Hague), Gordon Foote, **Ted Owen** (Maldon), Fred Pallant, Ted Waring and Ern Warwick for their 28MHz beacon logs from which I prepared the regular chart, **Fig. 3**, covering the period July 26 to August 25. Signals from a new beacon in Australia, VK8VF, were heard by Ted Owen, Fred Pallant and Ern Warwick on those days indicated. During the month, Ern also received signals on an occasional basis from IK6BAK (24.915MHz), PY2AMI (24.931 & 18.100MHz), PT7BCN (21.150MHz) and almost daily from ZS6DN and 4X6TU (14.100MHz) and DK0WCY (10.144MHz).

Tropospheric

The daily variations in atmospheric pressure, from July 26 to August 25, will also be found in my television column.

I received several strong broadcast stations from France while parked near Goodwood on the 19th and heard a variety of continentals spread through Band II while the pressure was high (1021mb) at 1930 on the 24th. Andrew Jackson received Band II transmissions from several stations in Ireland on days 15, 18, 19, 20, 24, 29 and 30, 'JAZZ FM' from London on the 18th, Belgium (Studio Brussel) and various transmitters in Holland (NOS 1, 2 & 3) on the 20th, France (RF Picardie) on the 29th and Germany (Deutschlandfunk & Hessischer Rundfunk), plus Radio's Broadland and Norfolk on the 30th.

Although at a camp-site 1.5km south of Banchory, surrounded by trees and 300m high mountains on all sides except the north, "where there's just a forest to cut out the DX", the opening on the 30th and 31st was good enough to enable **David Glenday** (Arbroath), to hear the Norwegian NRK Radio in Band II on both days.

While **George Garden** (Edinburgh) was TVDXing on Cairn 'O Mounth on September 2, he tuned through Band II and found a strong stereo signal from a foreign station, transmitting 'pop' music around 102MHz and, near 104MHz, there were two very strong signals from the new Scottish BBC Radio 4 transmitters, possibly Ashkirk Darvel or Rosemarkie. George also heard this signal while driving between Edinburgh and Laurencekirk at 0830 on August 31.

On the right of **Fig. 4**, is two BBC engineers, at Parham House, near Storrington, carrying v.h.f. back-pack transmitters being briefed just before the start of the 'live' programme *A House in a Garden* transmitted on Radio 2 during the afternoon of June 27. Each of these 'mobiles' worked with the programme presenters, Gloria Hunniford inside the house and Alan Titchmarsh in the garden.

	July					August																							
Beacon	26	7	8	9	30	1	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5
DF0AAB	x	x	x				x	x	x	x	x		x		x		x	x	x	x			x	x		x		x	x	x	
DF0THD		x			x					x	x		x				x		x				x	x						
DL0IGI	x	x	x	x	x		x	x		x	x		x	x		x	x		x	x	x		x	x	x	x		x	x	x	
EA3JA	x	x	x	x	x		x	x	x	x	x		x	x		x			x	x	x	x		x					x		
EA6RCM	x	x	x	x	x	x	x	x	x							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
IY4M	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x
HG5GEW	x	x			x		x	x	x	x	x		x		x	x	x		x	x		x	x	x	x			x		x	
KD4EC																												x			x
KF4MS																															x
LA5TEN	x	x	x		x	x	x	x		x	x		x			x	x		x			x		x		x		x	x	x	x
OK0EG	x	x	x	x	x		x	x		x	x		x		x	x	x		x				x	x			x	x	x	x	
OH2TEN	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x	x	x	x		x		x	
PI7BQC																			x					x						x	
PI7ETE																			x					x						x	
PT7BCN	x	x	x													x			x	x	x		x		x					x	
PY2AMI	x	x	x	x	x	x	x		x	x	x			x	x	x		x	x	x	x		x	x		x	x	x	x	x	x
SK5TEN	x	x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x		x		x		x		x	
VK2RSY		x		x	x			x	x							x													x	x	
VK4RTL																															
VK5WI					x			x							x	x													x	x	x
VK6RWA					x																									x	x
VK8VF									x																				x	x	
WA4DJS																				x										x	x
W3VD																															x
ZD8HF	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x		x	x
ZL2MHF				x																											
ZS1LA	x	x	x	x	x	x	x	x																							
ZS5VHF																														x	x
ZS6PW	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
Z21ANB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
5B4CY		x		x	x			x	x			x	x	x	x	x	x	x	x	x			x	x				x	x	x	x

Fig. 3.

Fig. 4.

ssb utility listening

Peter Rouse GU1DKD
Barcroft, Rohais de Bas, St Andrews, Guernsey, C.I.

It is with great regret that the government of SSB Utilities has voted to severely restrict its immigration quota of stations that do not speak in plain English. This situation has been forced on us by a flood of immigrants from Numberstationland who have been wandering in the desert for many years in search of their gurus, Havana Hanna, Berlin Betty, Moscow Mike, etc., and now think they've found a substitute in this column. The resident utilities population has started to complain and in future many applications for visas are likely to be stamped 'barking mad' and rejected by the chief immigration officer (me), unless they have startling new information.

Sanity Regained

Ron King has never mentioned a numbers station to me. This kind and well adjusted man used to work for the operations departments of Transamerica and Air Europe and he wrote the *Complete v.h.f. and u.h.f. Airband Guide*. Ron has provided some very useful information on how the military use the North Atlantic tracks.

They use seven routes across the Atlantic, which are all referred to by colour; Blue, Red, Brown, Yellow, Black, Orange and Purple. Black is further split into two extra options of Black south and Black north.

The only ones that make landfall in the UK are:

Blue: Sept Iles (Tacan) - Goose Bay (Tacan) - Scrod (5437.0N 0555Z.0W) - 55N. 050W - 5SN 040W - 55N 030W - 56N 020W - 56N 010W - Macrihanish (Tacan).

Red: Yarmouth (VOR) - Halifax (VOR) - Sydney (VOR) - Ramea (NDB) - Vysta (4830.8N 05244.7W) - 49N 050W - 50N 040W - 50N 030W - 50N 20W - 50N 10W - Land's End (VOR).

Black: Eric (NDB) - Hadok (5426.5N 5955.3W) - Loach (5531.0N 5701.0W) - 56N 050W - 58N 040W - 60N 030W - 60N 020W - 60N 0l0W - Leuchars - Coltishall.

Black (south): as for Black to Loach then 58N 050W - 59N 030W - 59N 020W - 59N 010W - Leuchars, etc.

Black (north): as for Black to Loach then 58N 060W - 61N 040W - 61N 030W - 61N 020W - 61N 010W - Leuchars, etc.

I am indebted to Ron for a long and detailed letter on the subject of the tracks. My only regret is that I do not have space to include all the other information he supplied as well (another time maybe).

You Write

Before I start with any logs, can I remind you that I cover s.s.b. utility stations (usually h.f.). I say that because quite a number of you have sent in a variety of listings for such things as military u.h.f. operations, which do not fall within the scope this column. I have no objection to this because I am an avid collector of frequencies, but unless it is s.s.b., it is unlikely to get a mention (it may be this column has no readers left by now but I will press on).

Paul H of Newbury has again sent in some goodies and revealed that the reason he is able to spend so much time monitoring is that he works shifts. On August 7, he monitored the evacuation of oil rig workers from the *Fulmar Alpha* rig on both 5.680 and 5.695MHz. The next day, he monitored Ascot 2100 with ex-hostage John McCarthy returning to RAF Lyneham using the callsign 'Crystal' on a 'phone patch via 'Architect' on 9.032MHz.

Paul has finally managed to hear US customs on 11.494MHz trying to intercept a possible drug running running aircraft near Jamaica. It involved ground stations 'Slingshot', 'Home Plate' and 'Almighty' with aircraft 'Kodiak 04' and 'Tijuana 41'. They did not quite managed to catch the aircraft before it landed.

During September, he spun the dial of his FRG-7700 onto a USAF frequency and heard *Air Force Two* (SAM29000) with the vice-president winging his way towards Nigeria. Paul has also come up with some more callsigns:

Gambler, Nickel, Switchblade and Tiger are Upper Heyford.

Evergreen and Ramrod are Lakenheath.

Banter Control is Mildenhall controlling tankers.

Three Geese is Fairford again controlling tankers.

Raymond Zero One is Langley Air Force Base in Virginia USA.

War 46 is the National Command Authority at Fort Ritchie in Maryland in the USA

Paul mentions that the Presidential back-up aircraft (SAM26000) appears to follow the presidential aircraft (*Air Force One*) just about everywhere and has been heard on 6.680MHz recently. Paul also logged Alconbury on 4.477MHz with an E3 AWACs 'Big Daddy'. He's also got the numbers bug now and heard a female reading numbers followed by the Lincolnshire Poacher on 9.251MHz.

Peter Finn also believes that some of the transmissions on the frequency may be from the UK as the signal is often very strong in South Wales.

Peter also wonders if some of the reports sent in by foreign correspondents use s.s.b. radio links, as they have that typical sideband sound to them. I am not aware of any dedicated press links, but there may be one of two possible explanations. First, the quality of telephone links from some countries is very poor and the heavy filtering that sound engineers need to use can lead to a slightly hollow sound. Secondly, it quite conceivable that radio links are occasionally used, but probably through existing services such as those offered by Portishead and Stockholm Radio.

Mystery

Now the mystery of the month, which has been sent in by **Chris Broughton**. He sent in a tape of a station monitored on 9.495MHz on September 12, which sounds like a radar controller passing information on targets that are clearly aircraft. Only one station can be heard and that uses the callsign 'Baker'. The other station, which is below the noise, is 'Delta 9 Quebec'. All targets are referred to by tracks that are tagged with letter/number identifiers such as 'Golf Echo 432' and on the tape, all the targets are identified as 'friendlies'. All map coordinates use a letter/number group such as NLJD54 and there is reference to the 'interesting area'. This type of radio traffic is not unusual on the military bands, but now the mystery: The frequency is slap in the middle of a broadcast band and the controllers accent is not British or American even though he speaks in English. At times, the accent seems to be Irish but then at others it sounds South African, although I suspect it is neither.

I have monitored the frequency several times but not heard the station. Keep a listen out for this one and if you can identify it let me know and I will pass the word on.

Tom Davies has sent logs from South Africa and he has a good path into Pacific and Far East areas. His log includes Auckland Volmet on 6.679MHz, Singapore and Bangkok on 8.942, San Fransisco on 11.282 and Honolulu on 13.089MHz. Tom uses a Kenwood R-1000, Sony ICF 2001D and feeds them via an a.t.u. from an indoor helical antenna mounted in his loft.

And Finally

Before I sign-off, an apology if your log has not been mentioned. Unfortunately, a major mix-up happened during the previously mentioned alterations to Chateau Rouse. Early in September, some of the letters received over a period of about three weeks were inadvertently destroyed. If you sent in snippets and were not mentioned, you now know why.

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bandscan

NORTH AMERICA
Gerry Dexter, RR4, Box 110, Lake Geneva WI, 53147 USA.

Once again it's time for our quarterly look at what's happening on short wave in the Americas and, as usual, there seems to be a lot of news.

Some of the most interesting listening targets of late aren't the rare, hard to hear DX stations but simply unusual programmes paid for by specific interests and aired on some of the independent US short wave stations. One of the most recent additions is Croatian Radio Zagreb, a daily one hour programme produced by the station based in the Croatian capital and aired over LeSea Broadcasting's WHRI, Indiana at 0000 nightly on 7.315MHz. The programme is intended for Croatian expatriates and those who left Croatia in recent years in order to escape communism. Of the hour long broadcast, 15 to 30 minutes is in English. Croatian Radio Zagreb, a name only adopted in 1990, claims it is the oldest station in Southern Europe.

Radio Miami International, a station planned to beam to the Caribbean, hasn't gotten the go-ahead from the FCC yet. While it awaits positive results it is buying time on WRNO, New Orleans. Its Spanish language broadcast begins at 0200 on 7.355MHz. So far, the planned Radio Copan International, Honduras, also planned by Radio Miami International hasn't shown, though it is still expected and may be active by the time you read this.

Radio Miami International is also acting as a middleman in arranging airtime for a number of anti-Castro Cuban organisations that are now broadcasting programmes intended for listeners in Cuba. Most of these are being aired over WWCR, Nashville, Tennessee, some of them on a nightly basis, some only on one day of the week.

Radio Free New York, a pirate-like programme that was aired weekly on WWCR has discontinued its broadcasts. By now, though, something quite interesting should have taken its place. The new programme will be of special interest to s.w.l.s and radio hobbyists!

Speaking of WWCR, it now has its second 100kW transmitter on the air and rumour has it that yet a third such unit is on order. There seems to be more and more evidence that there are a lot of groups willing to pay to get their own programmes out to the international short wave audience!

The possible rebirth of currently silent KCBI in Dallas that was mentioned last time has still not happened, even though a summer season frequency schedules was arranged.

VoA Notes

The Voice of America's Philippines relay station had problems due to ash from the Mt Pinatuba volcano eruption last June. The ash, plus wind and rain caused a loss of the satellite feed from Washington. Telephone lines had to be used for several days until a new satellite dish could be put up at the Tinang transmitter site.

The Monrovia relay site in Liberia is said to be in very bad shape after the civil was there. It's hoped Monrovia will return but no one seems to have any idea when that will be. Before too much longer the VoA will have a short wave relay on the air from Botswana. Construction should have started by now on a new relay site in Sri Lanka that will eventually feature three 500kW transmitters. The proposed relay in Israel is, however, in trouble again. The Israeli High Court has forced a halt in construction until a study can be completed on the environmental impact the facility would have on the Negev Desert.

Still more VoA 500kWers are on line now. The big guns newly installed at the Bethany, Ohio site were testing in late summer/early fall. The amateur radio operators who work at the Bethany installation have arranged to issue special QSLs direct for reception of the Bethany relay. That's most welcome! And wouldn't it be 'loverly' if all relay sites would do that!

Ohio s.w.l., Ed Turner, loves old Hallicrafter sets. He has a shack full of them!

Washington Talk

It looks virtually certain that - eventually - surrogate broadcasters Radio Free Europe and Radio Liberty will be merged or swallowed by the Voice of America. One study is already calling for Radio Free Europe to discontinue programmes for Poland, Hungary and Czechoslovakia, and that would likely be the beginning of the end.

But perhaps not for the idea of government-sponsored surrogate broadcasts completely. Besides Radio Marti, beaming to Cuba via VoA transmitters, one US Senator is calling for a study that might lead to an RFE/RL type broadcaster beaming at China.

Tenessee short wave station WWCR makes a living by airing a wide variety of paid programming, including shows from anti-Castro groups.

South American Notes

Radio Frontera, San Antonio, Venezuela, which had been inactive on short wave for several years has returned to its old 4.760MHz frequency. Well, nearly. Actually, it's 4.761MHz. It's being noted in to sign off at 0257.

Radio Nacional del Ecuador is another station that was long active on short wave. They were gone a long time and have been back for quite awhile, but it seems a lot of listener's aren't aware of the fact. Perhaps that's because Radio Nacional doesn't have their own station. Instead, they're heard via HCJB for half an hour per day, at 1730-1800 on 15.220MHz with a programme in Spanish called *Letter to Absent Ecuadorians*. You can QSL Radio Nacional by sending your report in case of the *DX Party Line* programme at HCJB.

The correct name of the Colombian station on 5.535 mentioned last time is Ecos Celestales. It's a religious station, located in Medellin. Address: Apartado Aereo 8447.

Radio Nacional Colombia is reported to now have a bit of English in its schedule, namely on Saturdays at 2100 for a 15 minute programme called *Colombian Cultural Magazine*. Frequencies are 9.635, 11.825, 15.335 and 17.865MHz but these can vary a great deal!

No Go on Guam

Disagreements with the local government over who has title to what has prevented High Adventure Ministries from getting its KHBN on the air, even though the equipment has been on Guam for more that a year. It is very, very likely that High Adventure will give up on Guam and put KHBN on the air from somewhere else.

Other News

Let's note the return of still another station that's had some down time. Sani Radio, the religious/cultural station in Honduras that was active on 4.755MHz for a time has returned. It is still announcing its frequency as 4.755 but it's actually on 6.299MHz variable, running to 0000 sign off in Spanish and Miskito.

Radio Canada International's Sackville transmitter continues to be the source of more and more relays. The latest is something a bit unusual. The Cyprus medium wave station Radio Monte Carlo Middle East should, by now, be airing a 15 minute programme at 0400-0415 on 5.960 and 9.755MHz. RCI will get time on the Cyprus station.

That takes care of things for this time. Good listening!

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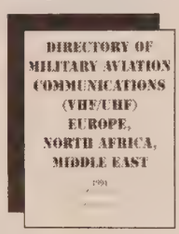

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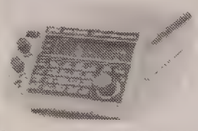

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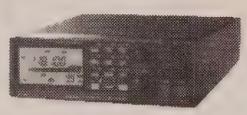

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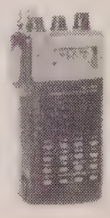

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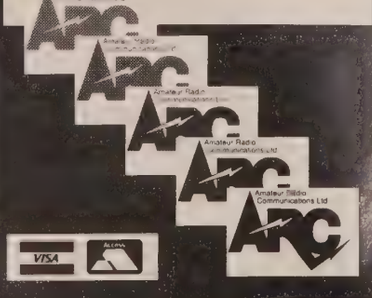

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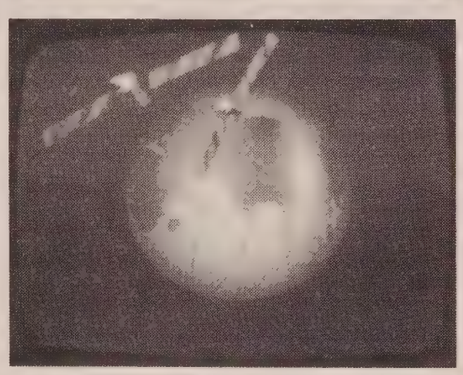
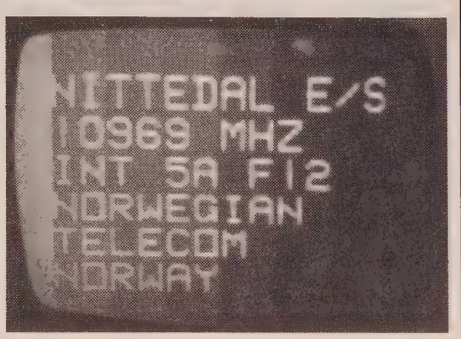
satellite tv news

Roger Bunney, 33 Cherville Street, Romsey, Hants SO51 8FB.

The Teleclub film channel over Astra 1A 11.332GHz horizontal, received in South Africa by Ian Roberts.



Middle East Broadcasting (MBC) is now operational, part of the station opening montage depicts two satellites transmitting MBC signals back to earth, the two satellites are Eutelsat 13°E and Arabsat 19/ 26°E.



Colour bars and from Nittedal Earth Station, seen over Intelsat at 1°W.

As Sky viewers may be aware, more difficulties have been experienced on Astra 1A and again it's problems in attitude control. During the afternoon and into the evening of September 1, the electronics controlling Momentum Wheel no.1 '*showed an anomalous behavior. As a consequence, the spacecraft lost its correct pointing, which resulted in loss of traffic in all transponders*' i.e. the satellite swung away from earth and all signals - both up and downlinks - were lost. Signal loss was from 1543-1955UTC. SES at Chateau Betzdorf actioned a spare momentum wheel to take over control. The following day, Astra 1B seemingly still had a problem with attitude control though since then, no signal loss has been observed - readers may recall that a similar problem occurred on June 4.

Olympus, the rogue satellite, has now been recovered and is now on station back at its original slot of 19°W. On May 29, last incorrect signals from the Italian Fucino ground station instructed the satelllite to swing away from its normal station keeping positon, as a result the batteries ran down and rocket correction fuel froze. The bird then drifted eastwards at about 5° per day but, following a succession of correction signals from high powered ground stations, control was re-established. Batteries were recharged, fuel thawed and the wandering satellite was returned to its original slot. British Aerospace (Stevenage) was prime mover in the rescue bid, which utilised several ground station sending many thousands of commands over a 3 month period.

With a more stable situation now in the USSR, there have been far fewer news feeds via the Gorizont satellites at 11 & 14°W. In fact, 11° has been very inactive during the latter part of September. Visnews still carry feeds over 14°W at selected times of the day - but attention has tended to focus on Yugoslavia. An insight into the country and the general situation can be seen in the daily programmes on Eutelsat I F4 - 7°E via the RTV Beograd programme 11.178GHz horizontal starting around 1700 through to 2200 approx. An additional 3 hour news programme is also being downlinked over (surprisingly) Eutelsat I F5 - 21.5°E at 11.471GHz from about 1830, again ex Belgrade. The 11.148GHz horizontal transponder over ECS II F1 13°E was seen carrying war footage ex Yugoslavia via an EBU circuit on September 18 during the evening for various European broadcasters.

The French 'TV Sport' downlink is being carried over Eutelsat II F2, 13°E at 12.7GHz (Telecom band). Eurosport appears on yet another satellite, this time the French Telecom 1A, 8°W 11.66GHz with English/French language subcarriers - downlink signal strength levels have dropped off markedly in recent weeks judging by the sparklies noted this past week. Sports feeds (golf) have been carried over the North Atlantic path via Intelsat VI F4 on a leased Brightstar transponder 11.12GHz vertical early in September. CBS TV New York was carried over colour bars on Eutelsat II F2, 10°E at 10.98GHz horizontal on August 26, an unusual sighting and the feed suddenly dropped carrier with no indication of source or reason. Another new programme is the MBC - Middle East Broadcasting on Eutelsat II F1, 13°E 11.554GHz horizontal now carrying test programmes through to Christmas - programmes started September 18.

A BAE Starbird TES (transportable earth station) has been operating out of Moscow seen with identification over Eutelsat I F4, 7°E with a WTN Moscow caption (World Television News). Check out 11.18GHz horizontal! The CNBC News programme for Super Channel is usually carried over the Brightstar permanent lease 11.505GHz vertical, recorded in at Super Channel for subsequent screening. And 'ITN SNG1 UK17' has been carried over ECS II F2 10°E at 10.98GHz horizontal during the evening of the 14th with colour bars, eventually cutting carrier 2230 with no other video seen.

Satellite DX ?

Though most staunch TVDXers feel that satellite reception is not really TVDX in the true sense, there are occassions that suggest DX is seen. For example I have been logging the three Israeli programme feeds from Intelsat VA F12, 1°W - in theory the signal is tightly spotted into Tel Aviv and invisible in the UK - at least on a 1.5m dish.

However, the honour this month is credited to Ian Roberts in South Africa who is receiving watchable signals from the Astra 1A satelllite orbital at 19.2°E, as is his friend Charles Vana, 100km south of Johannesburg! Ian has sent several pictures of his reception on his home-constructed glass-fibre 3m dish and 1.1dB noise LNB. The picture shows a bandwidth of 14MHz sufficient to pass the audio subcarriers, carrier to noise of about 6.5dB (2dB below threshold), larger dishes to 6m will provide noise free reception. Signals received are horizontal Astra 1A downlinks of Screensport, Lifestyle, Teleclub and RTL4. Other 'DX' successes are from Eutelsat I F4. 7°E with noisy mono pictures from the ET-1 (Greece) feed 11.55GHz horizontal. Ian estimates that the Astra signals are about 27dBW on the stronger signals (25dB down on the main boresight centre at 52dBW).

Orbital News

The Intelsat Organisation advise that their 4th in the series of Intelsat VI craft was successfully launched in August and is now located at 38°W, where it is undergoing a series of tests. The Atlantic slot allows access between the States and Europe for testing of the 38 C Band and 10 Ku band transponders. Tests should be complete by the end of September and the satellite will then be moved to its permanent orbital slot. A life of some 15 years is anticipated. Note: though the tests are not scheduled, it is possible to receive test transmissions if you are fortunate enough to monitor that dish heading at the correct time, I once saw tests at midnight! Eutelsat meanwhile have announced a delay with the launch of their Eutelsat II F3 destined to slot at 16°E, hopefully end October.

There is divided opinion amongst Europes satellite broadcasters over the European Council's directive for the adoption of D2MAC as the on-going standard for transmission. BSkYB and Filmnet are both opposed to D2MAC whereas SCANSAT (the Scandinavian cable TV group) that currently transmit in D2MAC are in favour of the standard. Further representation is to be made to the EC by commercial broadcasters objecting to the enforcement of the MAC standard. Incidently, Scansat are part of the organisation that has successfully applied for the Swedish first commercial national TV channel - M3 - that will operate from Malmo, Southern Sweden. A recent decision in Berlin suggests that D2MAC will be avoided in the interests of adopting a PAL Plus standard.

British Aerospace now have an involvement with the Motorola low orbiting Iridium project, a system of 77 low orbit satellites that will provide communications over the globe during the late 1990s.

Concern has been expressed by SES Luxembourg over the use of the higher powered series II Eutelsat craft at 16 & 21°E. The fear is of co-channel interference to certain TV channels carried over the Astra satellites. The use of 600mm Astra dishes with their relatively wide forward pick-up lobe is such that insufficient rejection of the nearby Eutelsat satellites will result. Eutelsat have been unresponsive!

Postscript-reader Chris Levy from Romsey uses a standard Amstrad satellite receiver and 600mm dish and has been using the system to search for other orbital craft and has succeeded in good reception from Eutelsats at 13, 10 & 7°E, with fair reception from sound in sync news feeds at 21°E.

This shows that it is possible to use the simplest of equipment for multi-satellite reception. If any reader is considering this approach to combine both domestic and hobby satellite viewing then I would suggest if possible obtain the 800mm Amstrad dish.

amateur bands round-up

Paul Essery GW3KFE
PO Box 4, Newtown, Powys SY16 1ZZ.

Hello again!

The XY0RR group duly showed despite all the problems and, at the time of writing, have recently gone QRT after a successful operation.

The Hungarian ZA expedition got a licence, but then were 'prevented from operating by the Ministry of Defence'; now we are told that tomorrow, September 16, will see a first contact between ZA1 and the UN station, with bigwigs at each end. That I can accept; but I go further and hope then to find some true-blue ZA stations, trained and equipped by the group who got as far as setting all this up.

Mid-afternoon, July 17, there was a station signing ZA1A, on 14.145, listening up between 14.175-14.200, working Europeans. The beam heading was about right, but the behaviour of the mainland Europeans on the frequency, mainly DLs, and the foul language, were of a sort which would indicate to any sensible administrator that amateur radio ought to be banned world-wide! Frankly, I felt ashamed to be an amateur. Why can't the national authorities world-wide determine the licences of such oafs?

Simplify!

Ever thought of a home-brew receiver? **Ron Pearce** over there in Bungay, changed from his usual 0-V-1 tool to using the *SWM* Two Transistor Receiver designed by G3RJV, and using parts from Ron's junk box. On 14MHz s.s.b. he found JA9AA, 4X1MO, 9K2YA, CX3AAE, YV5KHE, LY2ZO, ES1QD/2, KB2KK, W7NES and SM7DHZ; Ron notes that next time he'll report on 7MHz with the same receiver.

Brian Lucas continues in his training school near London. He has now obtained G7JTW and is having fun on 144MHz, but a degree of no-success on 50MHz. Basically, Brian is discovering that 50MHz is a band where you put a call out on a dead band with no success, in the end get a contact and then find yourself at the sharp end of a pile-up - especially if you have a GM or GW or whatever prefix for rarity value. Another lesson Brian learned the hard way occurred when he took a 'handy' to the village green to search for distant repeaters; standing in the middle of the cricket pitch he put a call out and the red light indicating flat battery came on. All I can add is that I regard that as fair punishment for walking on the cricket pitch! Seriously, if you go out with hand-held gear, charge the batteries fully first, and if you can take a spare charged battery pack.

Next, a letter from **Peter BRS 36554** of Newcastle-on-Tyne. Peter is now up to 283 countries confirmed on the bands, with ET2A, ST0DX, KB5LRO/KH9 on 28MHz and ZK1BY cards in the latest batch. On 28MHz Peter mentions logging AP2JZB, HH2BN, HI8OMA, OD5QZ, PJ2HB, S01A, VP8CFM, V51EG, V85GA, YF0CHA, WP4CLZ, ZP6FGS, 3B8FA and 5H3GM. Turning to 14MHz he includes A41JR, A41KB, CE3NKA, CN8EC, CY9CWI, D68RH, FK8CP, FK8FI, HC2HVE, HI8FHD, HI8OMA, HK0EFU, HL1UA, HZ1AB, JX3EX, JY3ZH, KP2/VS6CT, OA4AWW, OA4OS, OY2VO, ST0DX, TG9AFA, TJ1FN, TU2JL, VK9LA, VK9ND, VK9NS, VP2EBN, VU2JJQ, XE1ZLW, YN9BS, ZK1TW, ZP5MSC, 1Z9A, 3C0CW, 3D2XV, 4S7VK, 6K91WJ, 7X2AC, 8Q7CO, 9M2CW, 9M8PV and 9Y4BU.

Enormous List

A quite enormous list comes from **Gerald Bramwell** (Swinton) covering all the bands 1.8-29.7MHz. On each band, Gerald splits his listing into: USA/Canada, USSR, Europe and DX for the rest. He also makes good use of coloured pens to separate the sideband from the f.m. on 28MHz. The end result of all this trouble is a list which I can 'pick the bones out of' at a glance, despite Gerald having handwriting nearly as spidery as my own! Starting at Top Band, I notice the usual Gs, EI, I4ZUW and a couple of European Russians. 3.5MHz offered a couple of VOs, EA8BDW, CT3FF, 7X2BK, 5B4ES, 9Q5TE, 7X2DG and PY3JZ. Oddly enough though, no Ws are noted on 7MHz, the DX includes CE3PWD, Z21PO, PY2ELZ, PZ1EL, VU2AAG, CX5BW, PJ2MI, RA6LEV/JT1, 4X1MJ, 5B4MD, LU7LAQ, 4Z4BI, 9K2HA, 7X4AN, KP2/VS6CT, HL1UA and EUs including C31RA. On 14MHz I see Ws, VEs, UA3P/GM0CQL, UL7AAC, 9M2CW, HL9HH, EA9TL, PY4AH, CN8ST, HK5DER, ZP5CGL, CN12DKH, ST0DX, 5Z4BP, PP7GAG, KP2/VS6CT, HZ1AB, VP8CFM, YV5ANF, 9K2HA, V51JB, OD5ZZ, VU2JJQ, T40PAN, KP4DBR, 7X2DB, VP25EQ, ZP5CF, 4X1FQ, YV5BTS, LU7BQ, EA9PY, LU1KKQ, OA4OS, VP8CEN and EA8LD. On 28MHz, the f.m. section of the band yielded FD1NKA, FD1NEK, G0TZM, DL4MDX, ON4AXV, FD1PFP and EA8FP.

Back in July, Brian Lucas' group reported an OT0KT at Ostend Radio celebrating Marconi. Now we have a letter from the Ostend Radio club station OR0OST. This points out that they have never had the call OT0KT, but they have been using OT0OST as a celebration of 40 years reign by King Boudwijn, the dates for use of this special prefix being March 3 to July 21. In addition, they note a couple of Awards. For the first one, you have to show you heard or worked OR0OST or OT0OST. For the second, you have to hear or work OR0TT and the OR0OST/OT0OST. Send your certified GCR list plus five dollars or 6 IRCs to Club station OR0OST, Plovie Ronny ON6CQ, Perronstraat 6, B8400 Oostende. In either case the contact can be on any band, but not through a repeater. Thanks for a most interesting letter and clarification from the gang at Ostend Radio.

Vince Cutajar (Malta) logged YV2BYT, 8Q7CO, VP2EBN, 3C0CW, ZF2QQ, AP2JZB, ST0DX, LZ3RR, FR5DX, HC2AQ, ZL1BDW and KP2A/KP5 all on 24MHz, while 18MHz yielded FM5EP, HF0POL, CY9CWI (St Paul), 8Q7CO, VK2IP, 9L1LA, ZC4KS, HI8A, PY0FF, V31KX, AP2JZB, V44KAQ, HC2AQ and KP2A/KP5.

Patience

Mike Davis (Thornton Heath) doesn't get too much time for listening these days. However, the point of Mike's letter was to enclose his QSL - I have sent it back as requested - from VE1RCMP, the call which commemorated 50 years of RCMP. Mike sent his direct card off, along with 2 IRCs and a copy of the log, and got his QSL back, just four days short of two years later! When the card eventually turned up, Mike had completely forgotten ever sending a report; as he says, he hopes his experience will teach newcomer s.w.l.s the art of patience where QSLs are concerned!

On to **J. Scott** (Glasgow 14), who now has a SSTV program for the Amstrad; he has also been in touch with RSGB and BATC for membership - good! Listening on 7MHz produced GB2SRM, PA3FOO, PA3DIP, GB300FW and GW3WFU; on 14MHz he found IK3IEQ, VE7BNW, VK3HW, UO5OQ, VK3LAR, VK3WAO, LY9IZZ, HB9CCL, OH6JD, YU2CLH, GB0NTS, S9RM (Sao Tome & Principe), OE5KPN, W2OQM, W2IIU, UZ4WWQ and GB0ALG; while 21MHz coped with JL1UJG, PZ1AP, W1TAK, 4X6YY, YC8ZEA, YC8VYY, KE2OP, K1OIK, UA6BGB, ZS6AUH, WA2VOS, UT3UA, W0TZL and NM7R/MM. Reception by way of a G5RV or a 10m wire antenna, through a switch box to an a.t.u. Much time is spent decoding RTTY and c.w. with various bits and pieces.

Mainly CW

Andrew Marriott of Bath listens mainly to c.w. On 18MHz he found OJ0/OZ1NG, OH0/DF1NH, W6OWI, WA0CML (Colorado), K9SSB/7 (Arizona), VE7SR, ZP6CW, 4X/K2XA, while 21MHz gave PY2BDN, PY3PR, PR7JB, LZ1CY/MM, JA7AGK and ZZ2YY. Just to convince himself his antenna was OK, Andrew also listened to 7MHz s.s.b. for a few minutes in the contest, to log 4U1ITU, UC7O, UW2F and I1A.

D. McLean down in Yeovil notes that with the equinox conditions the 28MHz band has opened up, with N. America sometimes as early as noon until 2200UTC. On 7MHz, Don logged GW6UW/P (St Tudwals Is) and 3C0CW; 14MHz yielded ED5VDX, EX8V, HB0/DK5WN, HL2LPT, JT1CS, KP2/VS6CT, KP2A/KP5 (Desecheo), RA2FM, SU1ER, SU1RR, TA1RR, UJ1K, UY0U, VKs, XE1AE, ZL4AN, 3B8FA, 3B8GA, 5H3DC and 5Z4FM. 18MHz gave A32DX/P, AL7I, ED5PAT, ES1QD/0, HI8A, JH7FMJ, PZ1EL, ST0DX, V51BG, VK3EO, VP8GAV, WA6CTX/7, Z21CS, ZB2AZ, 4U1ITU, 9K2JH and 9M2DM. 21MHz saw A22AA, BY5RT, BZ4RBV, BZ4RBX, CE4MT, CM6LE, CN8GM, D66RH, ED5VDX, EX8V, HF0POL (S. Shetlands), HG20JP, HG32P, HR3JJR, IK2HTW/IA5, IK8NIM/ID9, JAs, JT1CE, P29NCS, RA1AKB, RY8BI, RY8DI, TJ1FN, UA0FF (Zone 19), UJ8XA, UM9MYY, VE7XN, VKs, VK9NS, VP2MR, VP25EQ, XY0RR, VE7XN, VKs, YJ8RN, Y88POL, ZD7DP, ZF2QQ, ZL4AN, 3C0CW, 8P9BZ, 8Q7CO, 9H8F (Comino Is), 9L3BM, 9M8ST, 9V1WW and 9X5SW. 28MHz pulled out HG20JP, KP2A/KP5, KP2/VS6CT, LU8XPD (Tierra del Fuego), ZD8WD, 5B4MF and 9J2HN.

Sign-off

That's the lot for this time. Thanks to all who wrote, and to *DX News Sheet*, *The DX Bulletin*, *The DX Magazine CQ's* 'Contest Calendar' for the input; the mistakes of course are mine, hi! For next time the deadline is November 11 and December 2. For the December deadline please post in plenty of time to allow for the Christmas mailing delays.

QSL card from DF6FW to GB2PW 14MHz band RTTY 12 November 1981.

dxtv round-up

Ron Ham, Faraday, Greyfriars, Storrington, West Sussex RH20 4HE.

To get started in the world of DXTV **Carl Bowen** (Strelley) received 'priceless help from Garry Smith' of HS Publications in Derby. Carl is equipped with antennas and amplifiers for Bands I & III, a D100 converter and a monochrome TV receiver. Between July 26 and August 18, he received pictures from Czechoslovakia (Ceskosolovenska Televize), Italy (RAI-Uno), Norway, Spain (TVE1), Switzerland (SRG) and the USSR (TSS) in Band I and Canal+ from France in Band III. Like many readers, Carl has found that RAI and TVE have been common catches during the 1991 Sporadic-E season.

Band I

There was a period of Sporadic-E almost daily throughout August when **Bob Brooks** (Great Sutton), **David Glenday** (Arbroath), **Andrew Jackson** (Birkenhead), **Simon Hamer** (New Radnor) and **John Woodcock**, between them, identified pictures from 20 countries ranging from the Mediterranean to Scandinavia in Band I (48 to 68MHz). Their logs contained reports of seeing logos, programmes and test-cards from Albania (RTSH), Austria (ORF), Czechoslovakia (CST & ISR-P), Denmark (DR Danmark), Finland (YLE), France (TDF), Germany (ARD), Greece (ETP), Hungary (MTV), Iceland (RUV), Italy (RAI Uno), Norway (NRK), Poland (TVP), Portugal (RTP), Romania (TVR), Spain (TVE), Sweden (SVT), Switzerland (+PTT), the USSR (TSS) and Yugoslavia (JRT). The Norwegian regional test-cards enscribed Bagn, Gamlem, Hemnes, Melhus and Steigen were seen, plus clock-captions from Germany, Iceland, Italy and Norway. Adverts, athletics, cartoons, dancing, gardening, films, musicals, news, singing, sport and variety were mentioned among the programmes they saw.

Meteor Trail Reflection

On August 8, just after the expected peak of the Aquarids meteor shower, Simon Hamer identified 'pings' of signals, in Band III, from Denmark (DR) on Ch. E10, Finland (YLE) and Norway (NRK) on Ch. E5 and Sweden (SVT) on Ch. E8. Readers interested in this mode of propagation should leave their receivers set precisely on the vision frequency of such a channel and watch for sudden burst of picture, lasting just a few seconds as the signal is deflected by the decaying ionisation created by a meteor particles burning up in the earth's atmosphere. Of course, random meteors are entering our atmosphere all the time, but periodically, the earth, on its orbital path around the sun, encounters great swarms of these particles know as showers, most of which are indicated by their numbers in **Fig. 13**.

Coming soon are the Taurids, Leonids, Geminids and Ursids when there is another chance to look for reflected pictures, or, if the sky is clear and free from moonlight go outside and take a good look, especially if you live in a locality without street lights. Burning meteors and fireballs can be a fantastic and colourful sight and do keep in mind that the showers are named after the constellation of stars from which the radiant of the meteor appears to come. Therefore one would look toward the constellation of Leo for the Leonid meteors. For the benefit of the computer buffs, Fig.13, was drawn, with the mouse and the Microsoft Windows 'paint' program on my Amstrad PC2286/40 and reproduced on a Commodore MPS1230 printer.

Picture Archives

Bob Brooks, has been TVDXing for a long time and he kindly sent some of the early pictures that he received, via Sporadic-E openings in Band I, for you all to see. His DX in 1983 included test-cards from Austria **Fig. 1,** the Norwegian regional Steigen **Fig. 2** and a newscaster from the USSR **Fig. 3**. There are three points of interest here, especially for newcomers. First, the Austrian signal is on Ch. E2A which is the same as Ch. R1 (49.75MHz), therefore it is not unusual to find the likes of Figs. 1 and 3 fighting for predominance on your screen during a big opening. Second, note the digital clock on Fig. 2, this is usually one hour ahead of us and thirdly, the Russian news caption HOBOCTN in Fig. 3. The latter may also read BPEMR. In July 1984 he saw a news programme from Spain's TVE **Fig. 4** about motorway traffic and in 1985 he saw the opening programme sequence from Portugal (RTP) **Fig. 5** and one of the Spanish news readers **Fig. 6**.

Lt. Col. Rana Roy received a strong caption from Bhatinda **Fig. 7** at his home in Meerut, India, on Ch. E12 in Band III during a tropospheric opening on June 11.

Weather

The slightly rounded atmospheric pressure readings for the period July 26 to August 25, **Fig. 14** were taken at noon and midnight from the barograph installed at my home in Sussex. Throughout this period, I only recorded 0.49in of rain, the weather has obviously been dry, sunny and warm with temperatures in the plus 70/80°F region.

Tropospheric

In Band III, Simon Hamer received pictures from Denmark and Norway on August 28 and Belgium, France, Germany, Holland and Ireland on September 4. John Woodcock logged pictures from France during the afternoons of August 12, 25, 27, 31, September 4 and 6. I found these French signals strong while parked near Goodwood on the 19th using a JVC3060 receiver with its own rod antenna inside my car.

After seeing interference, on August 30, on his BBC and IBA pictures from the Emley Moor Transmitter, **Andrew Lomas** (Barnsley) decided to investigate the cause. With a his son's Ferguson monochrome portable and a small set-top antenna, to his great surprise he was soon receiving pictures from the continent. Between 2132 on the 30th and 0041 on the 31st, he received u.h.f. transmissions from Anglia TV, Belgium (BRT TV2), Germany (ARD1, N3, NRD1, RTL, SAT1 & ZDF) and Holland (PTT NED3 and Lopik). In addition to American films, news and football, Andrew saw the captions Berlin Mitte, Bericht aus Bonn, Nordtext and Taggeschau (news).

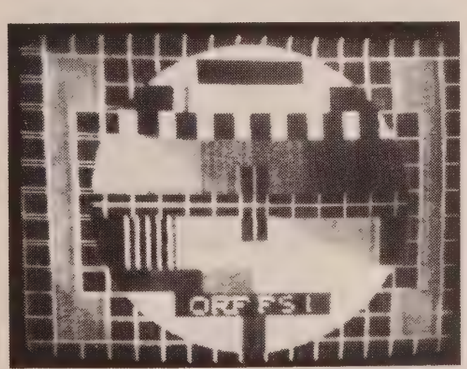


Fig. 1: Austria.

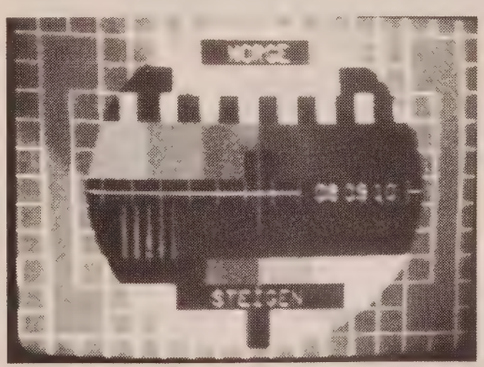


Fig. 2: Steigen.

Fig. 3: USSR.

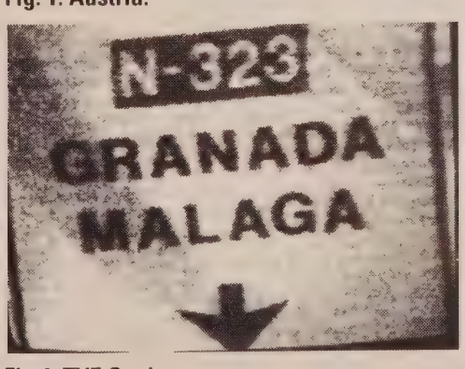


Fig.4: TVE Spain.

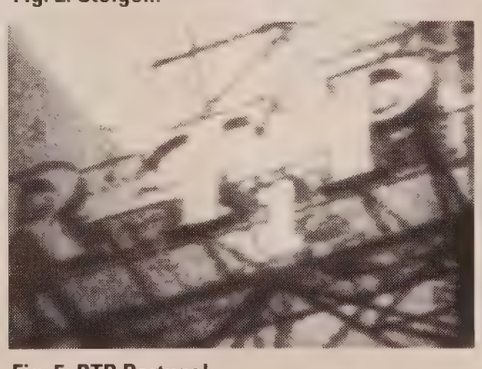


Fig. 5: RTP Portugal.

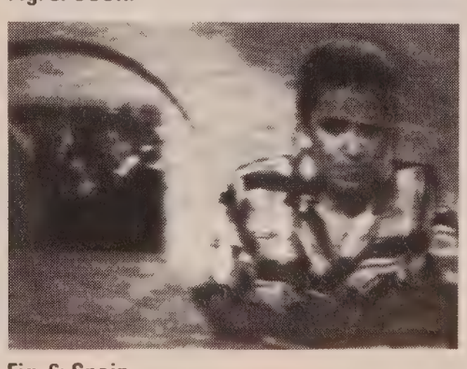


Fig. 6: Spain.

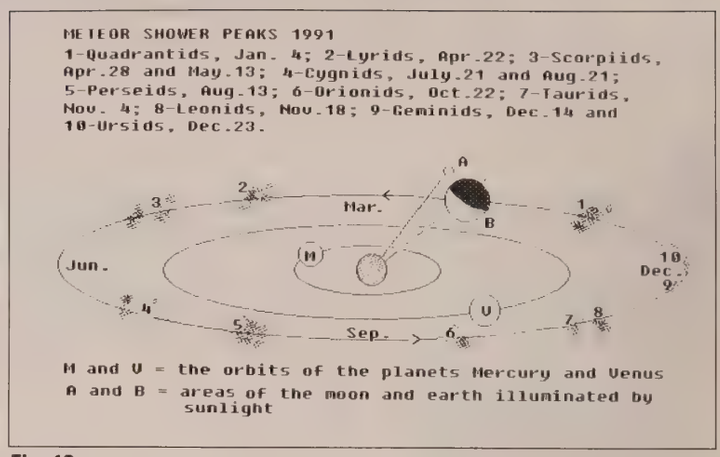

METEOR SHOWER PEAKS 1991
1-Quadrantids, Jan. 4; 2-Lyrids, Apr.22; 3-Scorpiids, Apr.28 and May.13; 4-Cygnids, July.21 and Aug.21; 5-Perseids, Aug.13; 6-Orionids, Oct.22; 7-Taurids, Nov. 4; 8-Leonids, Nov.18; 9-Geminids, Dec.14 and 10-Ursids, Dec.23.
A
B
M
V
Mar.
Jun.
Sep.
Dec.
M and V = the orbits of the planets Mercury and Venus
A and B = areas of the moon and earth illuminated by sunlight

Fig. 13.

Another good haul of u.h.f. DX came from Andrew Jackson who received pictures from Germany (ARD/ZDF) and Holland (PTT NED1&3) on the 20th and on the 30/31st he logged pictures from Denmark, France and Holland in Band III, German signals from their u.h.f. stations in Aurich **Fig. 8**, Bremerhaven/Cuxhaven **Fig. 9**, Flensburg, Hamburg, Hanover, Heide/Eiderstedt, Lubeck, Nebull, Neumunster/Schleswig and Wurzberg and Holland from Goes, Lopik **Fig. 10**, Markelo, Smilde and Wieringermeer. Similar conditions prevailed on the 3rd and 4th of September when he again received v.h.f. pictures from Belgium (BRT TV1 & RTBF1) and France (Canal+) and from France (Antenne 2 and TF1) Holland and Germany in Bands IV and V. His tropospheric DX came closer home on the 6th, 7th, 8th and 9th when he logged signals from Ireland (RTE1 and 2).

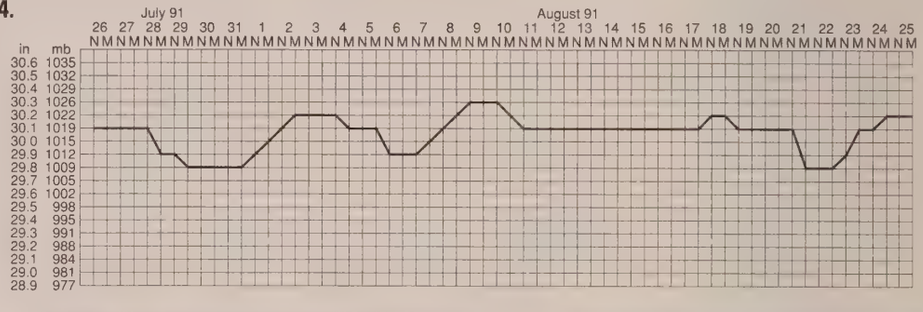
Although on holiday, on the 31st, at a camp site at the foot of a glen about 1.5km south of Banchory, a poor location for DX, David Glenday had with him a Band III dipole and his 14in. Grundig portable. He was 'stunned' to receive pictures from Holland (Wieringermeer) of NED. 1, 2 and 3 on Chs. E39, 45 and 42 and remarked, "the only u.h.f. signals coming in apart from Durris!" He then checked Band III and found Norwegian (NRK) stations on Chs. E5, 6, 7, 8, 9 and 11. Conditions were still good when Dave returned to Arbroath on September 3 and around 1300, he logged pictures from Belgium (BRT1 & 2), Denmark (TV2), Germany (ARD1, NDR3, RTL+, SAT1 and ZDF), Holland (NED1, 2 & 3) and Sweden (SVT2) spread through the u.h.f. bands. By 1500, Dave was high on Cairn 'O Mounth with a 5in Yoko portable and, with its own rod antenna, he saw Norwegians in Band III and Dutch in the u.h.f. band.

Realising conditions were good, **George Garden** (Edinburgh) visited this same high spot on the 2nd and his efforts were 'very amply rewarded' with many stations that he had not seen at that location before. In addition to test-cards from Belgium (BRT TV2) and Holland (PTT-NED3), George received a 'strong colour, grain free' BBC2 signal from the Caldbeck, Nr Carlisle, transmitter on Ch.E34 and ITV 'TYNE TEES' from Bilsdale and Pontop Pike. "Around 1630 the band completely opened up with a fair number of continental stations fighting for space," wrote George, adding that there was another Dutch programme just above BRT on Ch. 46 showing cartoons, lawn tennis, *Thunderbirds* and world news.

SSTV

During the month prior to September 7, **John Scott** (Glasgow) received slow scan television captions between 14.227 and 14.235MHz from stations in Germany **Fig. 11** and the USSR **Fig. 12**, both looking for contacts with others using a similar mode. John has joined the British Amateur Television Club and is delighted with their magazine *CQ-TV*. He has sent for back-issues containing articles about s.s.t.v. and found it an 'eye opener' that there is 'so much scope in the amateur TV field'.

Fig. 14.



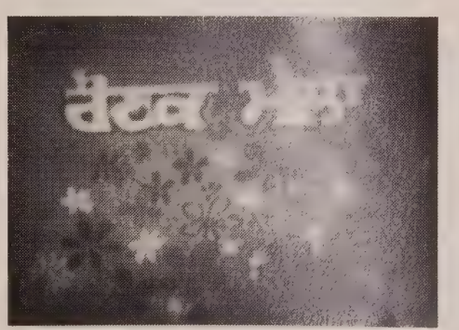


Fig.7: Bhatinda.

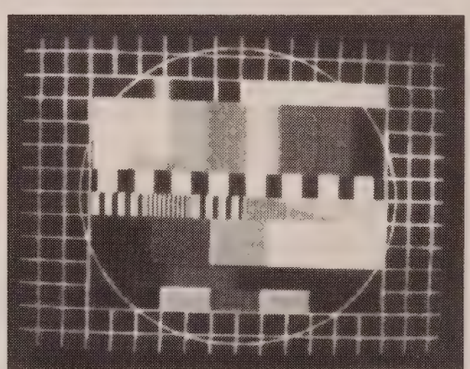


Fig. 8: Aurich.

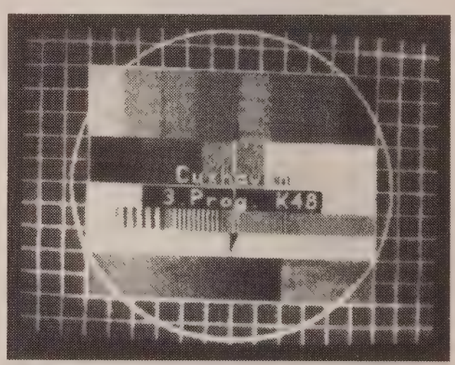


Fig. 9: Bremerhaven/Cuxhaven.

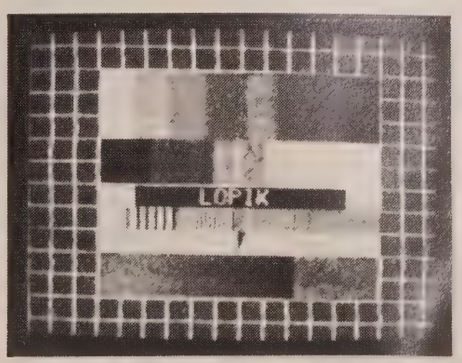


Fig.10: Lopik.

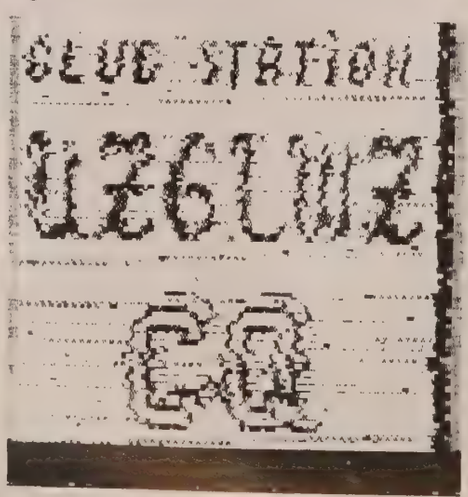


Fig. 11: SSTV from Germany.

Fig. 12: SSTV from USSR.

airband

Godfrey Manning G4GLM
c/o The Godfrey Manning Aircraft Museum,
63 The Drive, Edgware, Middlesex HA8 8PS.

At the PFA Rally 1991: A.61 Terrier 1.

Christine Mlynek

Strictly speaking, the airbands are mostly occupied by communications transmissions in which one station addresses a message to another specified station. An air traffic controller, for example, will give an instruction to one particular aircraft out of the many that are on frequency at that moment. Sometimes a brief broadcast is made, such as the announcement of a change in QNH.

Three types of pre-recorded continuous broadcasts are also to be found on certain frequencies. The VOLMET announces the actual weather, and sometimes important forecast, at a series of aerodromes. This is a centrally-provided service. Next comes the automatic terminal information service (a.t.i.s.). This information is broadcast by an aerodrome and only tells you about that particular aerodrome. As well as weather, the operational runway is given along with any problems such as unserviceable navigation aids. Sometimes a.t.i.s. is broadcast via a v.o.r. beacon (example: Jersey 112.2MHz via JSY beacon), which is why it's important to make sure that 108-117.95MHz is included when choosing an airband receiver. I hope this subtle difference between VOLMET and a.t.i.s. will help clarify matters for **Sid Morris** (West Midlands).

The remaining broadcast is that of the day's north Atlantic organised track system (133.8MHz).

Information Sources

Charts and other publications (presumably recently out-of-date?) were found on sale very cheaply at the RAF Finningley airshow by **Simon Utili** (London). Simon's in the Royal Observer Corps and was hoping for some air experience flights. As things are now more difficult financially, these might not take place - but if you are lucky, and I hope you are, then write and tell us what it was like.

Elsewhere you'll see my review of *The Aviation Enthusiast's Handbook* by Kevin Fox, which I recommend. **Sam Harris** (Billericay) bought this book. Please note that I am unable to reply directly to readers, but I always try to answer queries in this column.

Bob Ramshaw G3RLD (Northampton) hoped to start a radio amateurs' aeronautical net (see September issue). I am reminded by **Capt. Leslie Greville-Smith G4SUJ** (Wolverhampton) about the International Association of Airline Hams (PO Box 82412, Atlanta, Georgia, 30354-0412, USA). Some enlightened countries allow amateur aeronautical mobile operation, so a listen on the Association's net frequencies might yield some surprises. Sunday and Wednesday it's on 14.28 and on Thursday 21.38MHz (both ±QRM). During USA daylight saving, the net runs 1400-1700Z and 1500-1800Z when USA is on standard time. Leslie last flew the DC-9 for SAS; good to hear from you again.

Airways

What frequencies are contacted by eastbound aircraft once they complete their crossing of the north Atlantic? **John Fitzpatrick** (Doncaster) is asking. The simple answer is that the flights join the airways system controlled by either the Shannon or Scottish air traffic control centres. Exactly which of the many airways depends on where the actual north Atlantic track enters the Shannon or Scottish airspace. The best way to follow these is to find the route on an upper airways chart and then look up the control frequency in the airways section of the appropriate supplement. Aerad charts are as good as any, but the full choice of primary suppliers was given in October. As a rough guide, try 124.05, 126.85, 134.775 and 135.85MHz for tracks entering over Scotland and 124.7, 127.5, 131.15, 132.15 and 135.6MHz for flights arriving in Shannon airspace.

Follow-Ups

Lancaster *Aries* featured in September. I was right that someone would know its serial. **Keith Seddon G00QU** (Stockport) is that someone, PD328 was the serial. The first British aircraft to circumnavigate the world, PD328 was scrapped in January 1947 to be replaced by *Aries II*, Lincoln B2 serial RE264. One year later this Lincoln was destroyed by a fire during refuelling and its successor, *Aries III*, was of the same type (serial RE367).

Surprising how one past event prompts so much knowledge and enthusiasm from readers. **R. John Taylor G3OHV** (Crowborough) was stationed at No. 1 Navigation School RAF Shawbury at the time of the *Aries* flights. John took a three-year commission with the Fleet Air Arm before returning to the RAF. He remembers that *Aries* carried flight crew, an engine fitter, a rigger and a radio mechanic. Their achievement won each of them the Air Force Cross.

Peter Finn (Milford Haven) also recognised *Aries*. His brother, Basil, was the flight engineer on many of the sorties and found Iceland a pleasant change after the confines of the p.o.w. camp he entered, having been shot down in a Stirling.

More modern, also mentioned in September, is N112WA. This DC-10-30 was noted in service with World Airways again, this time by **Norman Locke** (Peterborough). According to **Peter Nicholson** (Huddersfield) this aircraft was leased to Lufthansa recently as well as Garuda. One Saturday at local mid-day Norman also saw a B.747 of Northwest on its way to the USA at around FL70; "A lovely sight in the summer blue sky." Wish I was there to see it, too.

Shannon VOLMET (September) is read by the same English voice as the UK v.h.f. broadcasts are. **Nicholas Austin** (Leigh-on-Sea) is, I believe, a professional meteorologist. Nicholas prefers this voice to 'mid-Atlantic' synthesised speech, an opinion I share.

Back to the Fw 200 (May and August). An anonymous reader from Brussels kindly sent details of *Wings of the Luftwaffe* by Capt. Eric Brown, CBE, DSC, AFC, RN, edited by William Green and Gordon Swanborough and published by Macdonald and Jane's (Pauton House, 8 Shepherdess Walk, London N1 7LW). Pages 7 to 18 describe the military career of this aircraft - in English! **Paul Hilton** (Newbury) will doubtless be interested.

Frequency and Operational News

Now that a new relay is functioning on 135.525MHz, reception of Shanwick Clearance Delivery should be improved in the south-east. I don't know the precise location of this new relay but its purpose is to enable aircraft departing the London terminals to make contact with Shanwick as early in the flight as possible.

Peter Nicholson asks about Scottish FIR frequencies. Flight information service (no radar) is available on 124.5, 124.9, 131.3 and 133.2MHz. Border Information is on 134.85MHz. To determine the exact geographical coverage of each frequency it is necessary to refer to the appropriate chart such as the half-million topo sheet 2150ABCD (current edition is 13). Of the above, Border Information is probably the region nearest to you, Peter.

In answer to **John Ware** (Redhill) and Simon Utili individual airfields, such as Leavesden, don't usually have relays but are confined to transmitters located on site. As mentioned in my reply to Sid Morris (above) the occasional a.t.i.s. is broadcast from a nearby v.o.r. beacon instead of, or as well as, from the airfield itself. The v.o.r. will be on a frequency below 118MHz whereas the direct transmission from the airfield will be on 118MHz or above (example: Biggin Hill departure information, 121.875MHz). Conversely, VOLMET broadcasts and London and Scottish Air Traffic Control Centre communications are distributed by relays throughout the country.

➡ 53

At the PFA Rally 1991: An immaculate De Havilland Moth.

Christine Mlynek

scanning

Alan Gardener
PO Box 1000, Eastleigh, Hants SO5 5HB.

News reaches me of a new hand-held scanner from AOR, spotted in Japan. Few details are currently known, but it is likely to be called the AR1500 and will include s.s.b. reception. This is achieved by the addition of a b.f.o. circuit, which will permit fine tuning of signals lying between the 5kHz receiver tuning steps. Physically it looks like a slightly stretched version of the existing AR900 and is anticipated to appear in this country early next year.

Scanning & Crime

My comments relating to the law and scanning receivers over the past few months has provoked several readers into writing, particularly regarding the monitoring of police communications. The illegal use of scanners has featured in several national newspaper reports of the current (at the time of writing) spate of joyriding, inner city riots and public order offences. It would appear that, in at least one case, the joyriders have been informed of police movements by people equipped with scanners and CB radios. In one instance, the home of a person who called the police was attacked after their address had been given over the air.

Many readers have commented that making it illegal to listen to the police is unlikely to have any any effect on people using scanners for criminal activities. One reader commented on the fact that until recently (when the emergency services had to change frequencies) it had been possible to listen to the majority of police communications just using a domestic radio. He wondered why it seemed as if the authorities had only just realised that members of the public could listen to the emergency services, when it had been possible more than ten years ago without requiring specialised equipment.

Another reader thought that monitoring police communications was a relatively harmless pastime and that it was a good thing to have an appreciation of the difficulties faced by the police whilst carrying out their duties. This may true when it doesn't involve any criminal intent, but the incident I mentioned previously occurred as a direct result of the misuse of a scanning receiver. The story doesn't end there, once the newspapers mentioned the fact that police radio channels were being monitored, members of the public became reluctant to give their own details when reporting incidents, as they didn't wish to have them passed on over the radio.

I would hope that the majority of people reading this column are respectable law abiding citizens who use their scanners in a responsible manner, but it would seem that unless a solution is found to the increasing number of crimes involving the use of scanning receivers we may all suffer due to the misguided actions of a few individuals. This may take the form of a more stringent enforcement of existing laws or a clamp-down on the sale and ownership of scanners - which would be unlikely to have much of an effect bearing in mind the number of receivers already in circulation.

One reader thought it strange that it was not an offence to sell scanning receivers. I can't quite see the logic in this argument, as there are plenty of perfectly legitimate reasons for owning one. However, I'm sure that if the authorities had foreseen the current level of ownership a few years ago they may well have made an effort to prevent them from being sold. In the majority of cases, where scanners have been recovered from the scenes of crimes, they have been cheap 10 or 20 channel models either bought or stolen from a well-known high street store. This doesn't imply a great deal of sophistication on the part of the persons involved, but remember that even a simple scanner will permit monitoring of most current communication systems. Indeed, it may be that professional gangs of criminals using more specialised equipment have yet to be caught.

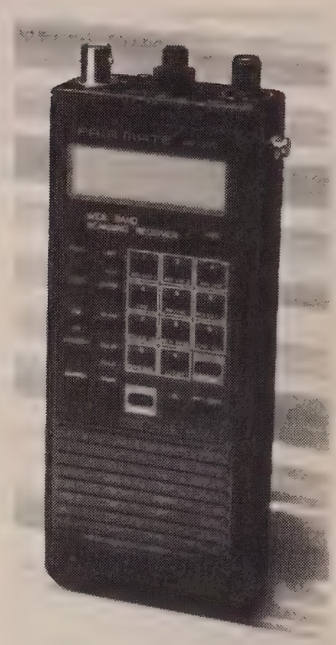
More than one reader has asked why the police don't scramble their transmissions. The simple answer to this is money. The cheapest type of scramblers use analogue techniques to modify speech patterns in such a way as to make them difficult to unscramble without specialised equipment.

Scrambling Techniques

The two most common methods of analogue scrambling are frequency shifting and inversion or time shifting and rotation. Because of the inbuilt resilience of human speech, which enables it to be understood even when severely distorted, it is difficult to effectively disguise the content of transmissions in this way. Given enough time and effort, both of these simple techniques can be descrambled. In order to provide more secure communications, digital techniques have to be employed.

The speech waveform is initially converted into a series of logical levels, which can then be mathematically manipulated to produce an encripted serial data stream suitable for transmission. This method of encription is very secure, as any resemblance to the original speech waveform is removed during the first stage of conversion. The subsequent mathematical encription process can provide millions of different permutations of the basic digital waveform, making decoding without the correct equipment extremely difficult. In order to make this even harder, the mathematical formula used for the encription process can be changed several times a second. So, even if someone was lucky enough to find the right combination of digits, it would only be valid for a fraction of a second. This is referred to as a rolling code encription system and is the method used in most high security military equipment.

AR-1000/2000.



HP-100/200.

However, the disadvantage of most digital encription systems is that the receiver has to remain synchronised to the transmitter in some way, so that the decoder knows which code is being used and at what point it is in the mathematical sequence. This is usually achieved by transmitting some form of synchronising signal at the start of transmissions and at regular intervals during them. This works well with strong signals, but when conditions are less than perfect, e.g. when using hand-held transceivers inside moving vehicles, problems can arise. If the transmission becomes broken, the receiver may lose synchronisation with the transmitter, in which case all of the transmission up to the next synchronisation burst is lost. Clearly this is not desirable when an undercover operation is in progress as it could mean losing vital information. The better designs manage to minimise such problems by the use of clever mathematical algorithms which embed synchronising information within the encripted data but this costs money - which makes it a major problem for most police forces.

When choosing encription equipment, it is important to select the best system available. Simple, but cheap, analogue scrambling will only give a limited amount of security, which would discourage casual listening but would not prevent determined individuals from monitoring. This is particularly important as technology has a habit of catching up with even the most sophisticated systems in time. I would imagine that encripted equipment will be introduced gradually over the next few years as existing equipment is replaced or as additional funds are made available. Given recent events this may well be sooner than expected.

If you have any thoughts on this subject or any related topic why not drop me a line.

AOR Modifications

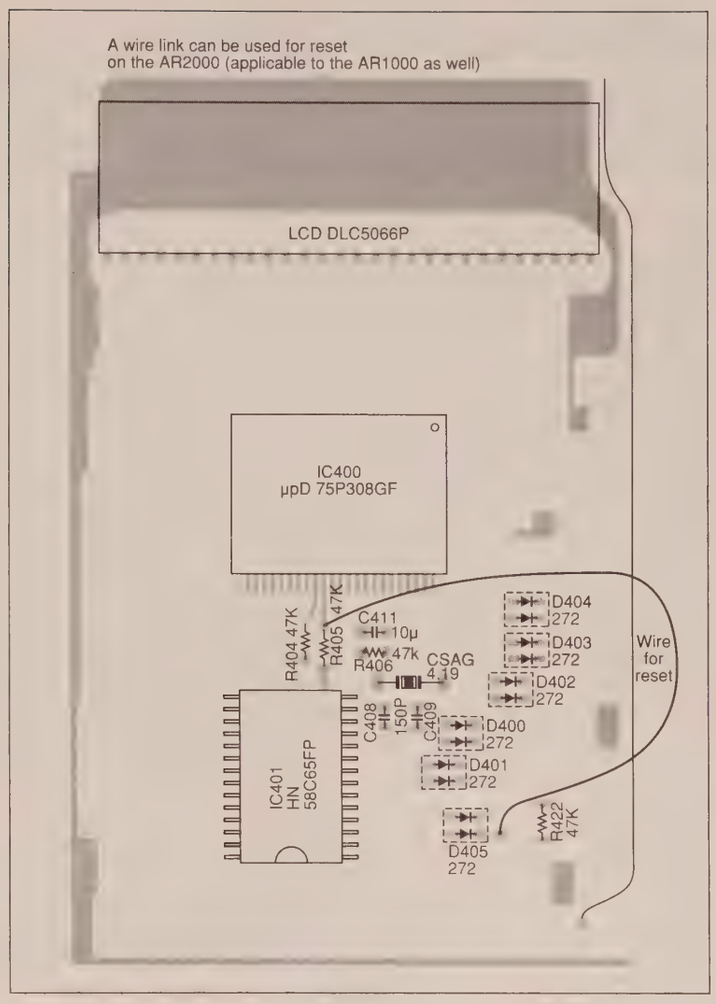
I have received a lot of feedback regarding the reprograming of the AR1000/2000 series hand-helds after I included it in the Sept column. It would seem that a few gremlins got into the printing process which caused a headache for one or two readers.

The procedure should also work for the Fairmate HP100/200 series scanners, although I have not been able to try it personally. Note that the reset procedure will erase all of the memories so you will have to reprogram the contents of any memory channels you may have used in addition to the search band frequency limits.

As far as I am aware, it is not possible to reprogram any other scanning receivers that have separate frequency bands to give continuous coverage. It may prove possible to trick the scanner into displaying a frequency outside one of the specified ranges, but it is unlikely to contain the additional circuits required before it can actually receive signals.

The main problem most readers seemed to have was associated with identifying the correct pins on the microprocessor chip. In order to correctly locate pin 1, turn the scanner so that the top of the case with the l.c.d. is pointing to the left. Pin 1 is now at the top left hand corner of the i.c. (marked with a dot moulded into the plastics). The rest of the procedure should now be correct. If you don't want to risk soldering to the i.c. pins directly you can use an alternative method which just involves temporarily soldering a short wire link between two points on the p.c.b. as shown in **Fig. 1** (shown on the next page). If you do use this method, I would suggest that you leave two insulated wire 'tails' connected to the points shown so that in future you

Fig. 1.



can perform a reset (should it be necessary) without having to completely dismantle the receiver.

It would also seem that more than one type of microprocessor has been used, so you could find that part of the procedure for extending the coverage between 600 and 800MHz doesn't work. If you find this to be the case you may have to settle for it and substitute line 5 in the original procedure for 5 [PROG] 297 [LIMIT] 600 [SEARCH] [>] 251.575 [ENTER]

For the AR2000 a modified procedure may be required. This is as follows.

As before the command keys are shown in brackets and the down arrow key as [>].

[BANK] 1 [PROG] 0.5 [LIMIT] 49.995 [SEARCH] 556.325 [ENTER]
2 [PROG] 50 [LIMIT] 107.995 [SEARCH] 556.325 [ENTER]
3 [PROG] 108 [LIMIT] 169.995 [SEARCH] 556.325 [ENTER]
4 [PROG] 170 [LIMIT] 286.995 [SEARCH] 556.325 [ENTER]
5 [PROG] 287 [LIMIT] 599.995 [SEARCH] 249.125 [ENTER]
6 [PROG] 800 [LIMIT] 1109995 [>] 249.125 [ENTER]
7 [PROG] 1110 [LIMIT] 1300 [>] 556.325 [ENTER]
8 [PROG] 600 [LIMIT] 799.995 [SEARCH] 58.075 [ENTER]

A couple of readers have commented on the apparent absence of a decimal point in the figure 1109995 in line 6. This is correct, as the receiver automatically assumes it to be present when more than a certain number of digits are entered.

My thanks to all the readers who passed on information on this subject.

Mike Totham writes from Cheltenham with a possible solution to Julian Long's computer problem, which I asked for help with in the September column. The problem Julian had was in persuading his BBC B computer to produce a data format of 8 data bits, no parity and 2 stop bits from its comms port in order to get it to talk to his AR3000 receiver. Mike gives the following example:

```
100 A% = &9C
110 Y% = &E3
120 X% = &10
130 R = USR(&FFF4)
```

The line numbers are just for clarity, A% will select OSBYTE call &9C or decimal 156 (i.e. *FX 156), Y% will clear only the existing word select bits in the 6850 ACIA control word, X% sets the word select bits to the required 8 data bits, no parity and 2 stop bits.

Most of this information was derived from *The Advanced User Guide for the BBC Micro* by Bray, Dickens and Holmes and published by the Cambridge Microcomputer Centre in 1983, which Mike recommends if you are considering writing serious programs for the BBC. My thanks to him for passing on the information which I hope will be of value. Let me know how you get on Julian.

Well that's just about it this time around. I hope that you enjoy reading the *What Scanner* supplement and that you take the opportunity to try and win the AR2000 hand-held scanner on offer in the free competition. Until next month -

Good Listening.

airband

➨ 51

I haven't yet come across any allocations in the new 136-137MHz subband which is now available but I believe that this segment would be available for airways control if the need were to arise.

Few USAF aircraft are fitted with SelCal but VC-25 No. 29000 operates as Air Force Two (the Vice-President's transport) and its SelCal is AE-LP. Remember to add this to your copy of *High in the Sky*. Staying with the USAF, their Thunderbirds display team talk to each other on 141.85MHz a.m. Their support aircraft is a C-141 Starlifter which rather puts our Red Arrows' Hercules in the shade. Thanks Paul Hilton for this USAF news.

How about the Soviet display team? The Red Knights were due to be at the RAF Leuchars display this year - and so was **Alastair Turnbull** (Helensburgh). Most displays are controlled on the airfield v.h.f. frequency but the military sometimes use u.h.f. where required. Do the Red Knights have their own frequency to talk to each other (presumably in Russian) during display? Leuchars Approach: 126.5 primary, 257.7, 362.3MHz. Tower: 122.1, 269MHz. Director surveillance radar: 123.3, 288.3MHz. PAR: 318.1 primary, 252.3MHz.

At the PFA Rally 1991, the author admiring the characteristic Jodel wing shape. *Christine Mlynek.*

Just like **B.D. Berman** (Burton-on-Trent) I can't understand the choice of which aerodrome is reported on which of the three London VOLMETs. I assume the arrangement satisfies users' requirements in some way. The relays are as follows. Main (135.375MHz): Davidstow Moor, Warlingham; covers Amsterdam, Brussels, Dublin, Glasgow, Gatwick, Heathrow, Stansted, Manchester, Charles de Gaulle. South (128.6MHz): Davidstow Moor, Ventnor, Warlingham; covers Birmingham, Bournemouth, Bristol, Cardiff, Jersey, Luton, Norwich, Southampton, Southend. North (126.6MHz): Great Dun Fell; covers Blackpool, East Midlands, Leeds and Bradford, Liverpool, Gatwick, Manchester, Newcastle, Ronaldsway, Teeside.

Receiver Problems

In August, Des Reed (Malton) was having problems understanding the instructions for connecting power to the AR1000. A helpful hint from **R. Raeburn** (Elgin) suggests that the supplied lead can be connected to a car's power system (presumably via the cigarette lighter socket) and battery charging plus receiver operation is presumably then possible. Mains supply, again for reception plus charging, can be obtained from the JIM PSU 101 which is advertised in this Magazine. Make sure you specify which receiver your PSU 101 is to be used with.

Until next month, I thank you for all your interesting letters.

The next deadline (for topical information) is November 11. All correspondence to 'Airband,' c/o The Godfrey Manning Aircraft Museum, 63 The Drive, Edgware, Middlesex, HA8 8PS.

decode

Mike Richards G4WNC
200 Christchurch Road, Ringwood, Hants BH24 3AS.

I thought I'd better start this month with a warning that I might be a little late with my replies over the next month or two. This is all due to a new arrival that's expected at the end of November. No doubt chaos will reign for a period thereafter. *(Not only at 200 Christchurch Road! - Editor.)* So please accept my apologies in advance!

Readers' Letters

Mr J. Howe from Horsham in Sussex is an amateur astronomer and would like to receive satellite images. There are two basic routes to achieving this:

1: h.f FAX or

2: v.h.f./u.h.f. satellite reception.

The h.f. FAX option is the area dealt with via this column and probably the most popular signal is the Meteosat images that are re-broadcast from Offenbach Meteo on 134.2kHz. To receive these, you need a receiver and antenna that will operate down to 130kHz plus a FAX decoder. If the satellite images are the main interest, then it's important to ensure that the decoding system is capable of displaying a grey scale. If you have an IBM compatible computer, there are several very good packages available at around the £100.00 mark. If you're starting from scratch and want to avoid computers, you should look at some of the self contained decoders such as those from Universal. I'd strongly recommend that anyone considering this route should visit one of the specialist dealers and spend some time making sure that it does meet your requirements.

If you choose the v.h.f./u.h.f. option, you can receive satellite images direct from the satellite itself. For more information on this keep an eye on Lawrence Harris' 'Info In Orbit' column.

John Dimond of Milnerton, South Africa has recently moved and taken the opportunity to set-up a new utility station. The main change is the inclusion of an IBM PC and the very powerful Code-3 decoding package. In answer to my recent query about DYN transmissions, John reports regular reception of press pictures on 9.2399MHz. The prime time for pictures seems to be between 1900 and 1945UTC.

Multi-path

Over the months I have made reference to the problems caused by multi-path propagation but haven't provided a full explanation. So here's my chance to put that right.

Let's start by explaining what is meant by the term multi-path propagation. Quite simply, it is used to describe the case where a signal travels from the transmitter to the receiver using more than one route. I've shown an example of this in **Fig. 1**. From this, you can see that one route is the direct path that is known as **the ground wave**.

The second route I've shown goes via the ionosphere and is called the **sky wave**.

The next point we need to consider is the effect that multi-path has on the received signal. To fully appreciate this aspect, we need to return to some basic theory relating to the speed of a radio signal. For the purpose of these calculations, we can use the speed in free space which is 300 000km/second - the real speed is actually slightly slower due the effects of the earth's atmosphere. If we now calculate the time taken for the two signals to travel from transmitter, we can work out the difference. My calculations show the ground wave as 0.67ms and the sky wave as 1.2ms. The important point, however, is the difference between the two, 0.53ms in this case. Now, this may seem very small, but it can have a significant effect on some forms of utility signal. Probably the most severely affected are FAX signals, where this delay produces a form of echo that results in every vertical line having a second line just to the right. This obviously destroys some of the fine detail in the chart. It's also important to realise that, in the real world, signals are rarely subject to one multi-path route and have very complex interference patterns.

These complex patterns produce severe smudging of FAX signals. I've shown a typical example in **Fig. 3**. The effect is very similar to the ghosting caused by a poorly aligned TV antenna. The TV ghosting is also caused by multi-path propagation, but over much shorter distances. Another important point to appreciate is that multi-path reflections can be caused by all manner of objects, and not just the ionosphere, typical examples being large buildings and hills. When receiving DX signals you may also receive signals by both the long and short path. I've shown an example of this in **Fig. 2**. As you can see, the time difference in this case is likely to be significant, so you would probably see a very distinct echo on a FAX chart.

So what, if anything, can be done to reduce the effects of multi-path? With the TV signal the solution is usually to position the antenna to null-out the unwanted multi-path signal. This is only possible because there is normally only a couple of signals to choose between. On h.f., the problem is rather more complex as there are likely to be many different multi-path signals coming from different directions. This is further compounded because few listeners have the space to be able to create steerable h.f. antenna systems. However, all is not lost as there is one solution that is available to all. You will have noticed that most of the large Meteorological authorities transmit the same charts on a number of frequencies spread throughout the h.f. bands. These frequencies have been carefully chosen to ensure that their signals can be received through a wide range of propagation conditions. The trick, therefore, is to try a number of different frequencies and pick the one that produces the best results. You will find that optimum frequency changes according to both the season and the time of day.

If you'd like a practical demonstration try tuning-in to Bracknell Meteo on the following frequencies: 2.6185, 4.782, 9.203, 14.436 and 18.261MHz. Remember, the results will vary according to the time of day. The format used by this station is 120 r.p.m. with an IOC of 576. Incidentally, it 's multi-path propagation that is largely due to the fading experienced by many broadcast signals.

If you have any utility related subjects that you'd like to me to explain, please drop me a line and I'll do my best to help.

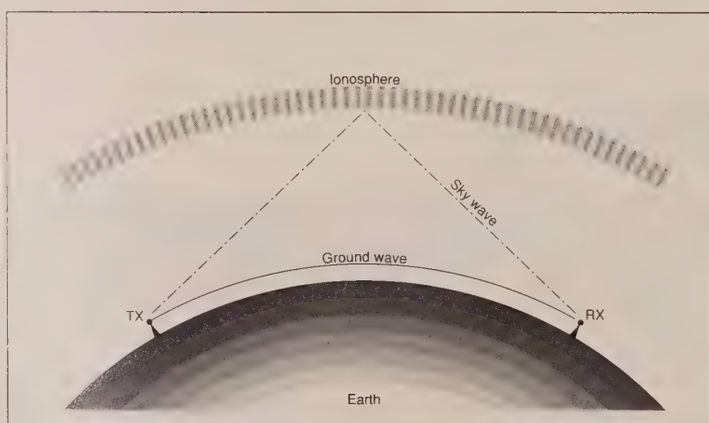


Fig. 1: Multi-path propagation.

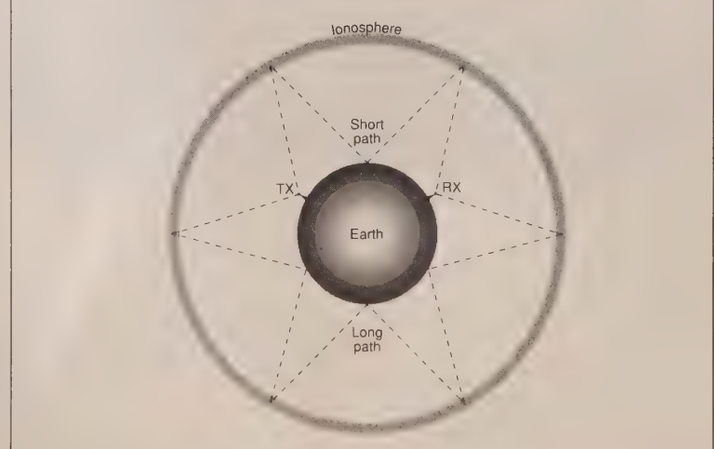


Fig. 2: Long and short paths.

Schedules

Mr W. Willes from Dorchester has written this month with the latest schedule for the Yugoslavian news agency TANJUG. In view of the troubled political situation, transmissions from this station are particularly important. TANJUG has also recently changed its transmission process so they're particularly keen to receive QSLs to confirm that their coverage has not been compromised. The transmissions described here are all 50 baud RTTY using a shift of 400Hz.

English Service

11.604MHz (YZJ2), 0400-1700UTC, SE Asia

13.44MHz (YZJ5), 0400-1700UTC, Far East

12.2125MHz (YZO7), 0400-1700UTC, Europe, Africa, Mid. East.

7.658MHz (YZD), 0400-1700UTC, Europe, Africa.

7.996MHz (YZD9), 1700-0400UTC, SE Asia.

7.806MHz (YZD7), 1700-0400UTC, Far East.

5.24MHz (40C2), 1700-0400UTC, Europe, Africa, Mid East.

7.658MHz (YZD), Europe, Africa.

Sundays 0900-2200UTC, Monday from 0900UTC.

French Service

15.705MHz (YZJ6), 1100-1400UTC, W. Africa.

10.278MHz (YZA9), 1700-1800UTC, W. Africa.

7.592MHz, (YZD6), 1900-close-down, W. Africa.

Sunday 1300-2000UTC

Spanish Service

19.8655MHz (YZJ4), 1600-1800UTC, S. America.

Not Sundays.

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AR-3000 ..... £765 p&p £5.00

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Designed for the professional market, the AOR-3000 is nevertheless affordable by the listening enthusiast, and the specification is enough to make any keen listener want this astounding receiver. Brief details:- Imagine a frequency coverage from 100kHz to 2036MHz: that's from below Radio 4 on the long wave to beyond satellites on 1.7GHz; and there are no gaps in the tuning range. Any frequency within this astounding range is yours to use as you wish • Imagine all mode facilities, including AM, FM (communications), FM (broadcast), Upper Sideband, Lower Sideband, and even CW, yours to command with the AR-3000 • Imagine tuning in 50Hz steps for accuracy on SSB/CW, with any step available at your choice from 50Hz to 100kHz, selectable in 50Hz increments. For really high speed tuning you can even increase all the steps by a factor of 10 by a touch of the main tuning knob • Imagine 400 memory channels in 4 banks of 100, with each bank having its own priority channel and each bank having its own programmable search system • Imagine high speed scanning at 20 channels per second, each memory channel having frequency, mode and RF attenuator setting stored safely in it • Imagine having a real time clock for accurate logging • Imagine having a built-in RS-232 computer interface for total control by a personal computer • Imagine having all this with outstanding performance which AOR built in to their famous AR-2002, but have now improved on for the AR-3000.

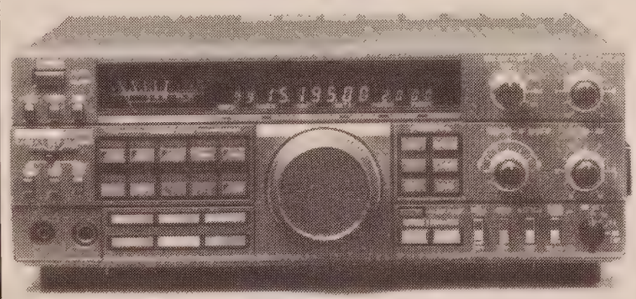
ACEPAK-3 Software for Computer Control of AR-3000 £119.95 p&p £3.00

IC-R72 Communications Receiver

ICOM's communications receivers have a reputation for reliability and quality. Building on this reputation, the IC-R72 HF receiver is one of a new line of wideband receivers to satisfy listeners everywhere. This compact receiver has continuous coverage from 100kHz-30MHz, in SSB, AM and CW modes. An optional UI-8 adds FM reception. The easy to operate IC-R72 is superb for beginners or experienced DXers alike and is equipped for a variety of functions.

Price ..... £659 Carr. £12.00

R-5000



R-5000 Kenwood HF communications receiver. 100kHz to 30MHz £895.00 £12.00

OPTIONS:

DCK-2	12 volt dc power kit £9.50	£2.00	YK88C	500Hz CW filter	£47.10 £2.00
VC-20	VHF converter for 108-174MHz £170.85	£4.00	YK88CN	270Hz CW filter ...	£55.85 £2.00
VS-1	Speech synthesiser for R-5000 ..... £33.00	£2.00	SP-430	External speaker unit	£41.70 £4.00
YK88A	16kHz AM cyrstal filter £50.45	£2.00			

HF-225

HF-225	Price	Carr.
HF general coverage Receiver, 30kHz to 30MHz.....	£429.00	£12.00

(The HF-225 has been voted "Receiver of the Year" by World Radio TV Handbook, against all other manufacturers products).

Options:

D-225 Synchronous AM and FM detector.....	£40.40	£2.00
K-225 Keypad for direct frequency entry.....	£40.40	£2.00
B-225 Internal NiCad battery pack.....	£50.60	£3.50
W-225 Active whip aerial	£19.95	£3.50
C-225 Deluxe carrying case for HF-225	£30.15	£4.00

AR-2000

Hand-held wide band scanning receiver. Improved specification. The coverage is 500KHz – 1300MHz with no gaps. Modes are AM, FM (narrow) and FM (wide). The AR2000 features 1000 memories for spot frequencies and 10 search banks. The receiver is powered from its supplied internal nicad batteries but these may be removed and dry batteries substituted to allow extended operation in the field. The AR2000 may also be charged and powered from the car cigar lighter socket using the supplied lead. Also supplied as standard are the DA900 wide band aerial, soft case with strap and AC charger.

R.R.P. including VAT £259 (p&p £5).

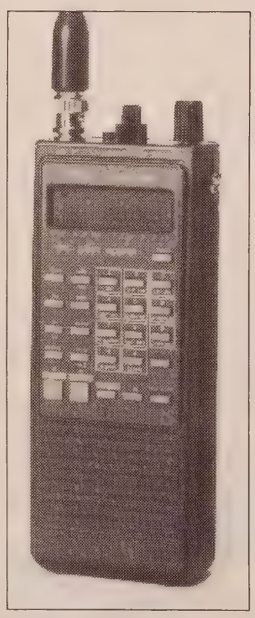


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PHOTO ACOUSTICS

English Regional Service

11.604MHz (YZJ2), 0400-0500UTC, SE Asia.

13.44MHz (YZJ5), 0400-0500UTC, Far East.

Sunday and Monday only

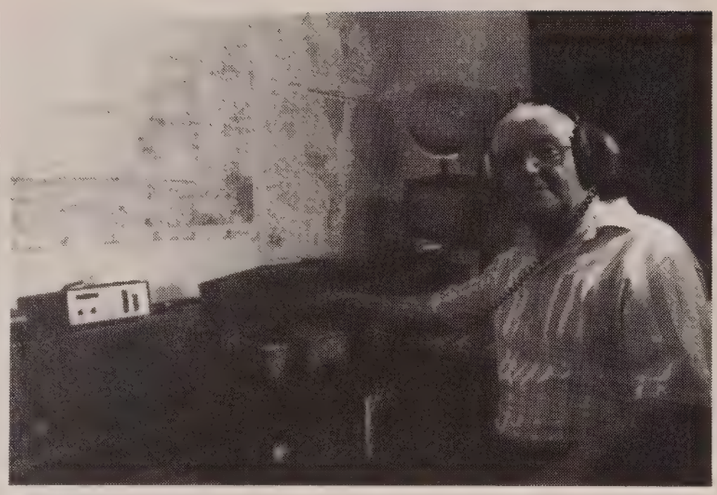
16.343MHz (YZI4), 1300-1400UTC, E. Africa.

20.204MHz (YZJ), 1300-1400UTC, S. Africa.

French Regional Service

20.204MHz (YZJ),1200-1300UTC, S. Africa (Angola).

QSLs should include a SINPO report and it might be a good idea to include a sample print-out. The correspondence address is: TANJUG World Service, Obilicev Venac 2, Post FAH439, BELGRADE, Yugoslavia.



The station as operated by Harry Scrase.

Photo-Call

The featured listener for this month is **Harry Scrase** from Sandwich in Kent. Harry has been a keen short wave listener for many years and is a member of the International Short Wave League. You can see from the photo that Harry has a very impressive equipment line-up. The main receivers comprise an Icom R-9000 and the NRD-525 these are fed by two Datong active antennas and a discone mounted externally. On the decoding front Harry uses the very comprehensive Wavecom W-4010. This is complemented by a CWR-675 stand alone RTTY decoder.

My thanks to Harry for taking the trouble to write. If you would like your station featured, send me a photo of you and your station with as many details as possible.

RTTY Contest

Bo Ohlsson from Fellingsbro in Sweden has written with details of the SARTG amateur RTTY contest that takes place on New Years Day. For those of you who may not have come across these contests, I'll outline what happens. The main objective is to contact as many stations as possible from as far away as possible. Points are awarded for each contact and additional points are gained for different countries and continents.

In order for a contact to count, a standard message has to be exchanged between each station. This usually comprises a three digit serial number, signal report and, of course, the callsigns. The main enjoyment in these contests comes from testing the skills of the operator, but many short wave listeners do join-in. Most contests, including the SARTG one, have separate sections for short wave listeners so you can win a certificate. If you'd like more information write to Bo Ohlsson SM4CMG, Skulsta 1258, S-710 41 FELLINGSBRO, Sweden.

Press Photos

For those of you with the ability to receive FAX images with a grey scale, press photos seem to be the most popular. For this reason, I've pulled together a few of these stations that you might like to try. One of the most popular, and consistent, is DPA Frankfurt (DCF39) on 139kHz. This uses a narrow shift of 150Hz combined with a drum speed and IOC of 120/352. The transmissions seem to be pretty well continuous between about 0300 and 2300UTC.

One of my own personal favourites is the Associated Press transmissions from Buenos Aires. Normally the best frequency is 17.672MHz (LQZ67), but other frequencies to try are: 10.6795MHz (LRN2) and 20.736MHz (LSA600). The main problem with reception of this station is adjacent channel interference, but this can usually be minimised by careful use of the pass band tuning. Just to complete the picture (excuse the pun) here are a selection of stations you might like to try:

4.316MHz (JJC), Tokyo Radio, 160/288 or 120/576.

5.117MHz (3MA29), CNA Taipei, 60/288.

5.7775MHz (LRO26), AP Buenos Aires, 60/288

6.874MHz (LRB79), AP Buenos Aires, 60/288

7.3637MHz (HMF88), KCNA Pyongyang, 60/288

9.242MHz (LRO64), DYN Buenos Aires, 60/288

10.679MHz (LRN2), AP Buenos Aires, 60/288

13.7535MHz (LRB75), Reuters Buenos Aires, 60/288 (rarely heard)

13.9MHz, Unknown, 120/576

16.23MHz (JAQ66), Kyodo Tokyo, 60/576

17.762MHz (LQZ67), AP Buenos Aires, 60/288

20.736MHz (LSA600), AP Buenos Aries, 60/288

If you have any particular favourites, please write with the details.

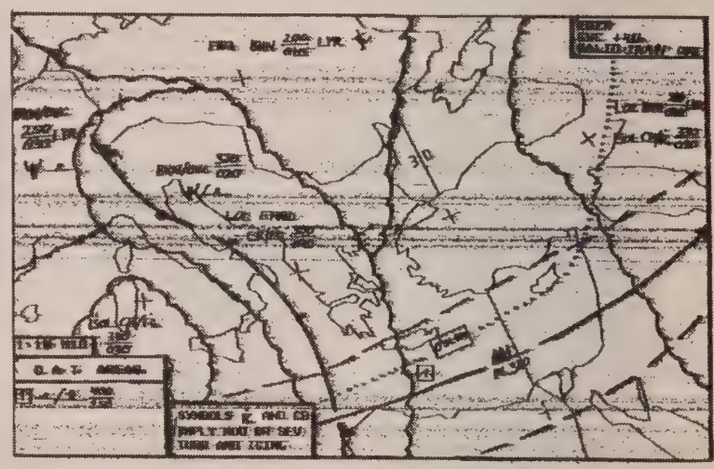


Fig. 3: Severe smudging of a FAX signal as shown in *Klingenfuss Guide To FAX Stations.*

Frequency List

Now for this months' selection of frequencies. I've used the normal format of frequency, mode, speed, shift, callsign, time and notes. If you would like a copy of my latest list just send three 1st or 2nd class stamps to the address at the head of the column.

3.55MHz, RTTY, 50, -, YMA20, 0005, Ankara Met

4.2585MHz, RTTY, 75, -, GYA, 0150, Royal Navy

6.358MHz, RTTY, 75, 400, PBC, 1523, Dutch Navy

7.959MHz, RTTY, 50, 400, 9BC23, 1816, IRNA Tehran - News

8.030MHz, RTTY, 50, 400, IRF50, 0950, Rome Press ANSA

8.049MHz, RTTY, 50, 400, -, 1945, IRNA Tehran - News

8.14MHz, RTTY, 50, 400, -, 0450, TASS Moscow

8.437MHz, CW, -, -, 4XZ, 0230, Israeli naval

8.574MHz, CW, _, -, LGB, 0230, Rogaland radio

8.652MHz, CW, -, -, PCH40, 0215, Scheveningen Radio

8.6835MHz, CW, -, -, DAM, 0610, Norddeich radio

8.687MHz, CW, _, _, SVA4, 0410, Athens radio

8.697MHz, CW, _, _, CFH, 0420, Halifax naval

9.43MHz, RTTY, 50, 400, -, 0820, Tirana press

9.797MHz, RTTY, 50, 400, -, 0910, Rompress

10.634MHz, RTTY, 50, 400, CNM37, 1550, MAP RABAT

10.792MHz, RTTY, 75, -, VoA, 0001, Voice of America

11.063MHz, RTTY, 50, 400, -, 0900, Sofia met

11.08MHz, RTTY, 50, 400, YKP28, 1816, SANA Damascus - News

11.475MHz, RTTY, 50, -, HMF52, 1855, KCNA Pyongyang English news

11.638MHz, RTTY, 50, -, DDK8, 0450, Hamburg Meteo

12.801MHz, CW, _, -, TAH, 1135, Istanbul radio

14.49MHz, RTTY, 50, 400, -, 0940, TASS Moscow

16.136MHz, RTTY, 75, 400, BZR66, 1230, Beijing press

17.06MHz, CW, -, -, 4X0, 0505, Haifa

18.125MHz, RTTY, 50, 400, RND70, 1323, TASS Moscow

info in orbit

Lawrence Harris
5 Burnham Park Road, Peverell, Plymouth, Devon PL3 5QB.

The summer months have brought many pictures for this column and so I am including more of these than usual. Another trend has been the number of requests for information for beginners. Since the special *Weather Watching* supplement was published last April new products are reaching the market and others are being upgraded.

Current WXSATS

As of mid-September all four of the NOAA WXSATs are in operation, but as the passes overlap, one or more are switched off. Until recently, NOAA 10 took priority over NOAA 12, but this changes as from September. So we should now have NOAA 12 transmitting during pass clashes with NOAA 10. NOAA 9 is now considered to be 'experimental' though the tests are likely to affect only the h.r.p.t. data. There was a report that the minute markers on NOAA 12 had disappeared, but I never saw them missing. The detail at the edge of NOAA pictures can be seen in **Fig. 1**. It includes the markers, and where you can resolve the markers on your own systems you will know that each has two lines. The other side of the frame shows a set of grey scales and can be used to adjust your picture for best quality.

METEOR 3-5 operated for a few hours following its August launch, but has been silent since. I don't think that this indicates a fault - other METEORs have been operated similarly, being tested for 24 hours after launch and then having their a.p.t. switched off. METEOR 2-19 remained operating for several weeks, but predictably, as it approached the morning terminator in mid September, it was switched off and METEOR 2-20 commanded back on, using the same frequency (137.85MHz). METEOR 3-4 has been transmitting both visible and i.r. as normal.

The Chinese controllers have managed to partially stabilise the attitude of FENG YUN 1B and it is now transmitting, but only while near China! GOES continues to wander above and below the western horizon here in the UK. Its position cannot be adjusted, or 'ranged' as the controllers call it, and so is not transmitting in a fixed direction. From western Britain it rises to some 15° above the western horizon during the mid afternoon, but dips below during the early hours of the morning. Several *SWM* readers have been able to monitor afternoon transmissions. Just a few degrees to the left of GOES is the 'borrowed' METEOSAT 3 geostationary satellite, now called Atlantic Data Coverage (ADC) and operating the schedule mentioned last month. METEOSAT 4 has continued to broadcast scheduled imagery - and see the later paragraph labelled AVHRR pictures.

Summer Views

Following the reports from America about NOAA 9 having problems, I had a close look at the evening pictures during the hot summer patch in early September. The warm Atlantic and North Sea show up very well in the infra-red section, with Paris, London and Birmingham particularly identifiable. In fact, with such clear skies, the variations in water temperature around the UK and the continent gave the impression of 3-D pictures. Water near the shores is considerably warmer than that in the middle of the Channel. Similarly, the waters of the sunny Mediterranean were revealing fascinating temperature differentials. To see the complete picture you do need to view with 64 grey levels, so bear that in mind when considering either upgrading or purchasing from new.

Although some of the snow has melted on the Swiss Alps, they remain easily recognisable for the whole year. Have a glance at Mount Etna in Sicily, which always stands out well. Lastly, the ice-flows along the south eastern coast of Greenland retreat during summer and allow warmer water to go further inland - all very easy to monitor in both infra-red and visible.

UoSAT 5 Pictures

I regularly publishes readers' pictures obtained from the usual WXSATS and for future editions I am hoping to obtain some of the very high resolution ones from ESA and NOAA. The University of Surrey are also involved in satellite imagery, under **Professor Martin Sweeting G3YJO** and his group who control the UoSAT satellites. UoSAT 5 is the fifth in the British series of small low-cost spacecraft and is fitted with a CCD Earth Imaging System. It was launched alongside ERS 1 on July 17, has a resolution of 2km and carries out sophisticated on-board image data compression and processing before transmission.

Professor Sweeting has kindly sent me a transparency together with some details about the satellite, which has already transmitted images of the Mediterranean, Gulf States, Korea, Hawaii and many other regions with superb resolution, comparable to the NOAA satellites. The ground controllers at Surrey University are able to routinely program the satellite to record imagery while passing over various areas and store the data until within range of the University. Professor Sweeting points out that within a budget of £1M they now have a satellite independent of governments or the military, able to monitor world-wide weather and climate. I will be providing more information about UoSAT 5 in future editions and extend both my thanks and our congratulations to the Professor and his team at Surrey. It is pleasing to hear of successes in the British space programme at this time.

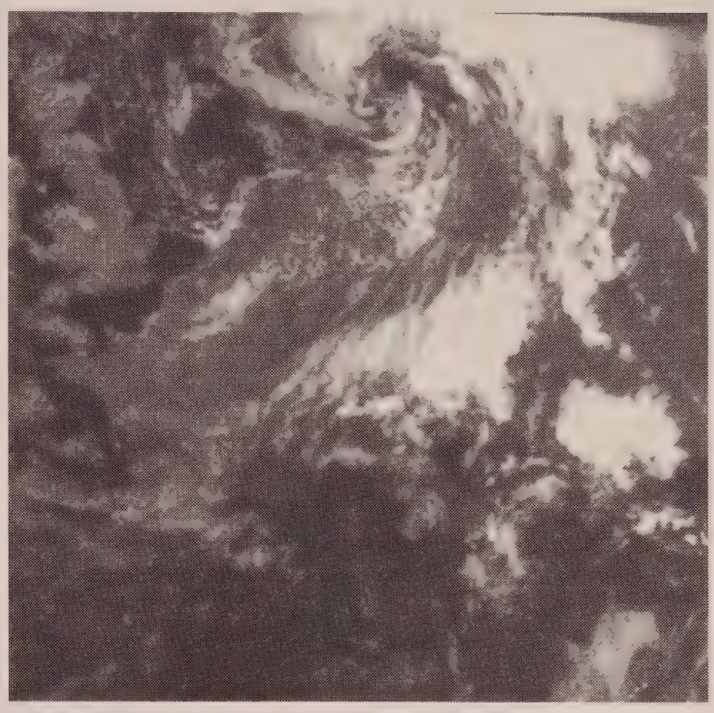


Fig. 1: Europe seen by a NOAA, from Jim Granville.

Letters

Many letters continue to request Kepler elements, and these are normally updated each week from NASA information. Correspondents usually take the opportunity to describe their satellite monitoring activities, which is welcome. **Geoffrey Chance** of Redruth uses the APT-1 module from Technical Software for decoding pictures and told me that he had some problems getting properly synchronised pictures. The fault was eventually traced by Richard Wilmot of Technical Software and Geoffrey mentions Richard's courtesy and patience. Geoffrey promises some print-outs as soon as he has mastered the setting of the grey levels!

A wide range of questions were posed by **Terry Day** of Hull. He has an AT (advanced technology) compatible computer and now wants to purchase hardware and software for satellite decoding. Terry points out the range of prices and facilities offered by the main suppliers of WXSAT equipment and wonders whether they all do the same

Fig. 2: Italy scanned by METEOSAT, from Peter Cotton.

Fig. 3: Europe (AVHRR) scanned by METEOSAT 4, from Brian Dudman.

job. Careful checking of program specifications is essential. Decide which facilities are particularly wanted: picture quality, picture processing (i.e. the ability to add false colour and stretch the contrast), animation, automatic data capture; these may be included or absent and one must also check whether the computer can run them without hardware modifications.

Yachting is a hobby shared by several readers of this column, including **Andrew Freeman** of Wallasey. There is an increasing variety of weather satellite picture decoding equipment being produced for the yachting fraternity, suitable for using on board. The normal crossed-dipole antenna should be satisfactory because there is no need to point the antenna at the satellite - receivers are sensitive enough to pick up the powerful signals, particularly at sea where reflections from nearby buildings, and interference from paging units must be negligible! I don't personally know of specific units, but I know a man who does - so I'll see what is available.

C Harper of Blackpool has recently started WXSAT monitoring, using a Martelec receiver fed from a Microwave Modules METEOSAT antenna and down-converter. I saw a picture of this antenna some years ago and it seemed very large. Incidentally, I believe that Microwave Modules have finished their involvement in the amateur market, their products having been taken over by Timestep Weather Systems.

David Brown of Port Erin has upgraded his previous framestore-type decoding system to the Proscan receiver from Timestep. This is one of the units which is apparently immune to interference, so I await reports from users. David feeds the signal into a 286 (i.e. an 80286) computer fitted with an SVGA monitor and PC SAT3 software. He also recently received a book called *The Illustrated Encyclopedia of Space Technology* published by Salamanda, which he recommends.

E J Finch of Peterborough has two satellite systems, one uses Timestep's PCSAT3 with a 0.9m dish feeding a 386 PC (i.e., a computer fitted with the 80386 processor) and 4Mb of RAM, which he leaves running 24 hours a day in animation mode. The other is for the polar orbiters using the Timestep Proscan receiver. Mr Finch comments that he is sure that FENGYUN 1B was recently transmitting again on 137.80MHz, even though only for a few minutes, and was intermittent. As mentioned before the Chinese are trying to correct the problems with FENGYUNs attitude (pointing accuracy), so we may well hear it at sometime.

Bob Warriner of Lancing has upgraded his fixed dish system to a steerable unit and can now monitor GOES. I have mentioned the movement of GOES near the horizon, which Bob experiences, and he asked about a GOES replacement. It seems that the next GOES will not be launched until possibly 1992 because of problems. That is why METEOSAT 3 was moved nearer the USA. Interestingly Bob picks up the METEOSAT 4 signal while pointing near GOES. Perhaps there is a local reflection.

METEOSAT Schedules

Bob asks about obtaining a METEOSAT 3 transmission schedule. This, together with the slightly modified METEOSAT 4 schedule, is available from EUMETSAT at: Am Elfen grund 45
D-6100 Darmstadt-Eberstadt
GERMANY.

Framestore Components?

I had a call from **Graham Smith G1JVZ** of Chislehurst who wants to build a framestore, but he has not been able to find a component supplier. Can anyone help? Originally one could purchase a kit of all the parts.

AVHRR Pictures

A telephone call from **Donald Martin** of Cleveland pointed out the new experimental WEFAX pictures from METEOSAT 4, which he monitored using PCGOES. I didn't spot this addition to the schedule - called simply AVHRR. The times are 0726, 1026 and 2226UTC when a transmission of the UK and Europe, as seen by the NOAA AVHRR sensors, can be received. A picture of this frame was sent to me by **Brian Dudman** of Harrow and is shown in **Fig 3**. Brian is using a Timestep Yagi, preamp and METEOSAT receiver feeding a Mitac 286 AT computer. Brian comments that, not being familiar with computers he had a lot to learn and had difficulty setting up the monitor. He points out that not all hardware is water-proof and that items such as pre-amps need to be protected against the elements.

My own down-converter suffered some corrosion even though it was apparently weather-proof. I now operate it within a plastics 'sandwich' box and bring it in for occasional checks. Brian has also bought Timestep's Prosat2 software and a second computer! There will be more pictures from Brian next month.

Correspondent **Peter de Jong** of Leiden in Holland has sent in his detailed monitoring observations and some more photographs, and comments that you can see the Japanese GMS satellite pictures by watching the JSTV programme on Channel 24 broadcast by the Astra 1B satellite. Tune in at about 2145 and 2315UTC and you may see the whole disk picture. See also **Fig. 6**.

Geostationary Satellites

Apart from METEOSAT and GOES there are literally hundreds of satellites in the geostationary orbit. **Goran Billing** of Bournemouth asked about obtaining a list of them. My own list is now four years out of date, but this type of information is published in *Satellite News* which is a specialist monthly publication edited by Geoffrey Falworth of Preston. I am happy to forward any mail for Geoffrey. The weathersats mentioned above all use 1691MHz for their WEFAX transmissions so obviously if you can receive METEOSAT then there are currently three satellites to monitor.

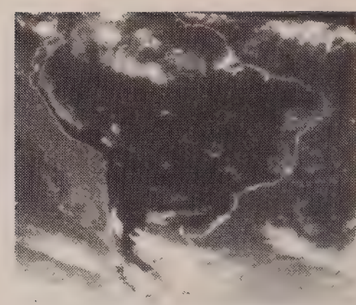


Fig. 4: South America scanned by METEOSAT 3, from Brian Dudman.

Australia

While visiting Britain, **Professor Gerald Sargent** of Brisbane in Australia rang me and told me about their groups that monitor weather (and other) satellites. He was particularly surprised at the cost of equipment in the UK. It seems that satellite picture decoding hardware and software is rather cheaper in Australia, though many people build their own as a project.

Kepler Elements

As usual, I will send a print-out of the latest elements upon receiving an s.a.e. All weather satellites are included, together with their transmission frequencies if operating. I recently received such a request from **Josep Bruno Argilaguet** of Spain who is a member of a Spanish group who are interested in meteorology. They are particularly keen on monitoring METEOSAT.

InstantTrack

Some readers may have heard of recent controversy involving this software which is currently marketed by both Timestep Weather Systems and AMSAT-UK. The problems were resolved and no purchaser of this software should feel concerned.

New Book

During the time that I was setting up my own satellite receiving system I had difficulty in locating information and suppliers for some items, and so I kept notes on the various problems that I came across. Since then I have received many questions about setting up similar stations and other satellite matters, so I am putting together a book on satellite monitoring and hope to see publication, through PW Publishing next spring. Further details will appear in future months, but meanwhile I shall be glad to hear from anyone who has any suggestions to make about possible items for inclusion. August was a record month for letters and photographs so several have been held over until the next edition.

Frequencies

NOAAS 9, 11 a.p.t. on 137.62MHz
NOAAS 10, 12 on 137.50MHz
METEOR 2-19 or 2-20 on 137.85MHz
METEOR 3-4 or 3-5 on 137.30MHz
OKEAN 2 and 3 on 137.40MHz occasionally
FENGYUN 1-2 was on 137.80MHz (keep watching this!)

Fig. 5: North America scanned by METEOSAT 3, from Peter de Jong.

Fig. 6: Japanese weather forecaster, from Peter de Jong. UoSAT 5

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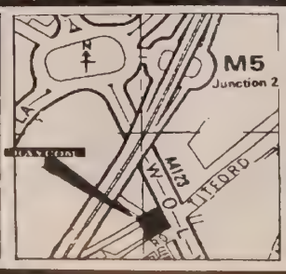

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Long Wave Reports

Note: l.w. & m.w. in kHz; s.w. in MHz; Time in UTC (=GMT). Unless stated, all logs were compiled during the four week period ending September 7.

Signals from Leningrad on 234kHz were logged for the first time by **Eddie McKeown** in Co.Down. He rated the signal as 21321 at 0312. He says, "I was quite stunned to hear this, but it was quite audible against the usual Junglinster background." Eddie has been monitoring 225kHz hoping to hear the new 600kW station in Van, Turkey, so far, the strong co-channel signal from Konstantinow has stopped him.

In Melvick, on the north coast of Scotland, **John Stevens** found he could hear the signals from Kalundborg, Denmark on 243kHz clearly all day. He rated them SIO333, a contrast to his home in Largs, where signals are marred by sideband splatter from Atlantic 252. The coloured map of European broadcasting stations in *Dial Search**shows the path between Kalundbourg and Melvick is mainly over the sea, offering little attenuation to l.w. signals, whereas the path from Clarkestown includes the highlands of Scotland. (*Available from *SWM* Book Service).

Signals from the BBC Westerglen and Burghead stations (50kW), which share 198kHz with Droitwich (500kW), were heard in Derby by **Roy Patrick** whilst Droitwich was 'off the air' for maintenance on the morning of August 30. The combined signal was S5.

MW Reports

A 10-day DXpedition to Dollar Law, Scotland made a welcome change for **Jim Willett** of Grimsby. The equipment consisted of a giant 5m square loop with differential pre-amp, a CL22 a.t.u. and Lowe HF-235. Electrics were provided by a small Honda generator. The loop was taken in sections and then assembled and erected. It could turned by hand to any bearing from 250- 290°.

Each night, Jim searched the band and logged 16 stations in Canada, 11 in the USA, 5 in the Caribbean and 5 in S.America. The earliest was CJYQ in St.John's, NF on 930 rated SIO333 at 0020. At 0600 ACB 20 in Panama was peaking SIO222. A worthwhile venture.

Some signals from N.Africa have reached the UK after dark. Those noted from Algeria were Ain Beida 531 (600/300kW) by **Darren Beasley** in Bridgwater; Les Trembles 549 (600kW) by **Ron Galliers** in N.London; Djanet 783 (5kW) 43444 at 2321 by **Leo Barr** in Sunderland; Algiers 891 (600/300kW) SIO222 by **Lee Williams** in Birmingham; Algiers 981 (600/300kW) 54555 at 2239 by **Noel Carrington** in Sutton-in-Ashfield. Also Sidi Bennour, Morocco 640 (600kW); Sebaa-Aioun, Morocco 1044 (300kW) and Tunis-Djedida, Tunisia 630 (600kW).

The signals from Yugoslavia via Zadar on 1134 (1200kW) have attracted attention. Following the announcement 'Croatia Radio' a news bulletin in English was heard at 2100 by Roy Patrick.

In daylight, the signals from BBC Radio Clwyd, Wrexham on 657 have travelled along ground wave paths to quite distant places! Despite fading and interference, **Phil Townsend** heard them in E.London. They were also heard in N.London. On the IoW, **George Millmore** (Wootten) logged them as SIO343.

A weekend in Bournemouth enabled **Robert Lawrence** (Cheltenham) to check the band from a new location. He heard BBC R.Cornwall via Bodmin 675; R.Devon via Exeter 990; R.Jersey 1026; R.Guernsey 1116; also ILR DevonAir R. via Occombe 954 and several nearby stations. His chart entries were logged at home.

Short Wave Reports

The most distant **25MHz (11m)** signals to reach the UK come from R. Australia's Darwin station. Although the solar activity has resulted in daily propagation variations, their signals on 25.750 (Eng to Asia, M.East 0900-1100) have often reached here like a local! The SIO455 by **Simon Hamer** in New Radnor at 1000 says it all. Some days the signal has been weak or even non-existent.

Very potent signals have reached here from the Voice of the UAE in Abu Dhabi on 25.690 most days. The broadcast in Arabic was 55354 at 0712 in Co.Down. Others taking advantage of the conditions in this band include Radio Norway Int, Oslo 25.730, Radio Moscow 25.780 and RFI Paris 25.820.

The 11m broadcasts from HCJB in Quito, Ecuador were discontinued in mid-August. Until then, many listeners enjoyed good reception of their upper sideband (u.s.b.) plus pilot carrier (p.c.) transmissions. Hopefully, they will be reinstated soon, meanwhile try their 13m u.s.b.+ p.c. service on 21.455MHz.

Although for other areas, some R. Australia's **21MHz (13m)** signals have been heard here in the morning. Those to Asia via Carnarvon 21.775 (Eng 0100-1000) were 35553 at 0655 by **David Edwardson** in Wallsend; to C/SE.Asia via Darwin 21.525 (Eng 0100-0800) 33233 at 0705 in Co.Down; to SE.Asia, M.East 21.720 (Eng 1100-1330) 33433 at 1100 by **Darran Taplin** in Brenchley.

Also heard in the morning were the BBC via Ascension Is 21.660 (Eng to S.Africa 0900-1745) SIO333 at 0900 by **Bill Clark** in Rotherham; DW via Julich 21.680 (Eng to Australia, N. Zealand 0900-0950) SIO232 at 0950 by **John Sadler** in Bishops Stortford; R. Afghanistan via USSR? 21.600 (Eng to Asia 0930-1030) 43433 at 1015 in Bridgwater; R.Nederlands via Flevo 21.520 (Eng to

Local Radio Chart

Freq kHz	Station	ILR BBC	e.m.r.p. (kW)	Listener
558	Spectrum R.	I	7.50	B,E,F,H*,I,K,L,O
585	R.Solway	B	2.00	B,J
603	Invicta Snd(Coast)	I	0.10	C,D,E,F,H,I,K,M,O
603	R.Gloucester	B	0.10	B,G,I,K,L,O
630	R.Bedfordshire	B	0.20	B,C,D,F,H,I,K,L,M,O
630	R.Cornwall	B	2.00	K
657	R.Clwyd	B	2.00	B,E,F,I,J,K,L*,M,O
657	R.Cornwall	B	0.50	K
666	DevonAir R.	I	0.34	D,H,I,K,O
666	R.York	B	0.80	B,L*,O
729	BBC Essex	B	0.20	D,F,K,L,M,O
738	Hereford/Worcester	B	0.037	B,C,E,F,I,K,L,M,O
756	R.Cumbria	B	1.00	B,J
756	R.Shropshire	B	0.63	B,F,I,K,L,O
765	BBC Essex	B	0.50	A*,C,D,E,F,L*,M,O
774	R.Kent	B	0.70	D,F,K,M,O
774	R.Leeds	B	0.50	B,C,J*
774	Severn Sound (3CR)	I	0.14	B,G,I,K,L
792	Chiltern R.	I	0.27	C,D,E,F,H,I,K,L,M,O
801	R.Devon	B	2.00	H,J,K,L*,O
819	Hereford/Worcester	B	0.037	E,I,K,L,O
828	Chiltern Radio	I	0.20	D,F,H,I,M,O
828	R.Aire(Magic 828)	I	0.12	B
828	R.WM	B	0.20	B,C,I,L
828	2CR	I	0.27	I,K,O
837	R.Cumbria	B	1.50	B
837	R.Furness	B	1.00	B
837	R.Leicester	B	0.45	B,C,D,E,F,I,K,L,M,N,O
855	R.Devon	B	1.00	K
855	R.Lancashire	B	1.50	B,C,J,L*
855	R.Norfolk	B	1.50	D,F,K,M,O
873	R.Norfolk	B	0.30	C,D,F,J*,K,L,M,O
936	GWR (Brunel R.)	I	0.18	G,I,K,L,O
945	R.Trent (GEM-AM)	I	0.20	B,C*,E,I,J*,K,L,O
954	DevonAir R.	I	0.32	H,K,O
954	R.Wyvern	I	0.16	C*,I,J*,K,L,O
990	WABC (Nice & Easy)	I	0.09	B,E,I,L
990	R.Devon	B	1.00	H,K,O
999	R.Solent	B	1.00	F,H,I,K,O
999	R.Trent (GEM-AM)	I	0.25	B,C*,I,O
999	Red Rose R.	I	0.80	B,J
1017	WABC Shrewsbury	I	0.70	B,C*,I,K,L,O
1026	R.Cambridgeshire	B	0.50	B,D,E,F,I,M,O
1026	R.Jersey	B	1.00	K,O
1035	R.Kent	B	0.50	D,F,K,M,O
1035	R.Sheffield	B	1.00	B,C
1035	West Sound	I	0.32	J
1107	R.Northampton	B	0.50	E,F,I,J,K,L*,O
1116	R.Derby	B	1.20	B,C,I,J*,L,O
1116	R.Guernsey	B	0.50	K,O
1152	BRMB (Xtra-AM)	I	3.00	C,E,I,J*,L
1152	LBC (L.Talkback R)	I	23.50	H*,K,O
1152	Piccadilly R.	I	1.50	B
1152	R.Broadland	I	0.83	D,J*,O
1161	GWR (Brunel R.)	I	0.16	G,I,K,L
1161	R.Bedfordshire	B	0.10	D,O
1161	R.Sussex	B	1.00	H,K,O
1161	R.Tay	I	1.40	J*
1170	Ocean Sd.(SCR)	I	0.12	K,O
1170	R.Orwell	I	0.28	D,O
1170	Signal R.	I	0.20	B,C,E,I,L
1170	Swansea Sound	I	0.58	I
1242	Invicta Snd(Coast)	I	0.32	C,F,H,L,M,O
1242	Isle of Wight R.	I	0.50	K,L*
1251	Saxon R.	I	0.76	F,J*,M,O
1260	GWR (Brunel R.)	I	1.60	I,J*,K,O
1260	Leicester (GEM-AM)	I	0.29	E,L,M
1260	Marcher Sound	I	0.64	B,J*
1278	Pennine R.(C.Gold)	I	0.43	B,C
1305	R.Hallam (C.Gold)	I	0.15	B,C
1305	Red Dragon (Touch)	I	0.20	E,G,I,J*,K,L*
1323	R.Bristol (Som.Snd)	B	0.63	G,I,J*,L*,O
1323	S'thern Sound(SCR)	I	0.50	F,K,M,O
1332	Hereward R.P'boro	I	0.60	J*,L,M,N,O
1332	Wiltshire Sound	B	0.30	I.J*.K,O
1359	Essex R.(Breeze)	I	0.28	F,H,M,O
1359	Mercia Snd(Xtra-AM)	I	0.27	B,E,I,J*,L,O
1359	Red Dragon (Touch)	I	0.20	G,J*
1359	R.Solent	B	0.85	J*,K
1368	R.Lincolnshire	B	2.00	B,J*
1368	R.Sussex	B	0.50	E,F,H,K,M,O
1368	Wiltshire Sound	B	0.10	I,K,L*
1413	Sunrise R.	I	0.125	H*,K,M,O
1431	Essex R.(Breeze)	I	0.35	C*,F,H,J*,M,O
1431	Radio 210	I	0.14	I,K,O
1449	R.Peterboro/Cambs	B	0.15	I,K,O
1458	GLR	B	50.00	K,O
1458	GMR	B	5.00	B,E,J*
1458	R.Cumbria	B	0.50	J
1458	R.Devon	B	2.00	K,O
1458	Radio WM	B	5.00	B,C*,G,I,L
1476	C'ty Snd(1st Gold)	I	0.50	F,I,J*,K,O
1485	R.Merseyside	B	1.20	B,E,J,L
1485	R.Oxford	B	0.50	C,I,K,O
1485	R.Sussex	B	1.00	F,H,K,O
1503	R.Stoke-on-Trent	B	1.00	B,C*,F,H*,I,J*,K,L,O
1521	R.Mercury	I	0.64	E,F,H*,K,M,O
1521	R.Nottingham	B	0.50	B,C,J*,L
1530	Pennine R.(C.Gold)	I	0.74	B,C,J*
1530	R.Essex	B	0.15	F,K,M
1530	R.Wyvern	I	0.52	I,J*,K,L
1548	Capital R. (Gold)	I	97.50	H*,K,O
1548	R.Bristol	B	5.00	I,J*,K
1548	R.City (City Talk)	I	4.40	B
1548	R.Forth (Max AM)	I	2.20	I
1548	R.Hallam (C.Gold)	I	0.74	B,C*,J*
1557	Chiltern R.(Gold)	I	0.76	C,D,I
1557	Ocean Sound (SCR)	I	0.50	E,K
1557	R.Lancashire	B	0.25	B,J*
1584	Gatwick	I	0.10	H*,K,M,O
1584	Heathrow	I	0.10	H*,M,O
1584	R.Nottingham	B	1.00	B,C*,J*
1584	R.Shropshire	B	0.50	B,E,I,L
1602	R.Kent	B	0.25	C*,F,J*,K,M,O

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

Listeners:
A: Leo Barr, Sunderland.
B: Tim Bucknall, Congleton.
C: Noel Carrington, Sutton-in-Ashfield.
D: Tony Elkins, Bury St.Edmunds
E: David Forester, Newcastle-under-Lyme
F: Ron Galliers, N.London.
G: Francis Hearne, Bristol.
H: Sheila Hughes, Morden.
I: Robert Lawrence, Cheltenham.
J: Eddie McKeown, Co.Down.
K: George Millmore, Wootton, IOW
L: Sid Morris, Rowley Regis
M: Phil Townsend, E.London
N: Ted Walden-Vincent, Gt.Yarmouth.
O: John Wells, East Grinstead

long medium & short

S.Asia 1130-1225) SIO333 at 1200 by **Cyril Kellam** in Sheffield.

Later, R.Austria Int, Moosbrunn 21.490 (Ger, Sp, Eng, Fr to W.Africa, S.Europe 1300-1700) was SIO444 at 1325 by **John Coulter** in Winchester; R.Finland via Pori 21.550 (Eng to USA 1330-1345) 32432 at 1340 by **John Nash** in Brighton; RFI via Issoudun 21.770 (Eng, Fr to SE.Asia 1400-1600) 45454 at 1442 by **Jim Cash** in Swanwick; R.Moscow 21.820 (Russ to S.Asia 0600-1530) SIO555 at 1458 by **Philip Rambaut** in Macclesfield; WHRI Noblesville 21.840 (Eng 1500-1700 Sat/Sun only, also to E.USA) SIO544 at 1520 by **Bryan Kimber** in Hereford; BRT via Wavre 21.815 (Eng to Africa 1730-1755) 34333 at 1730 by **Rhoderick Illman** in Thumrait, Oman; WCSN Scotts Corner 21.545 (Eng to S.Africa 1800-2000) SIO444 at 1930 in E.London.

Among the 13m signals to Europe logged were R.Japan via Moyabi 21.575 (Eng 0700-0800) 33333 at 0700 by **Sheila Hughes** in Morden; UAE R.Dubai 21.605 (Eng 1330-1400) SIO555 at 1330 by **Kenneth Buck** in Edinburgh; RCI via Sackville 21.545 (Eng, Fr 1400-1530) heard at 1400 by **Don Phillips** in Bridlington; HCJB Quito 21.455 (u.s.b.+ p.c.) 24444 at 1900 by **John Robertson** in Alnwick, also 21.480 (Cz, Eng, Ger, Sw, Sp 1800-2230) 44444 at 2200 by **Antonio De Abru-Teixeira** in Durham; WYFR 21.500 (Eng, Ger, Fr 1700-2000) 45554 at 2000 by **John Parry** in Northwich and 21.615 (Ger, It, Eng 1700-2000) 22232 at 2000 by **Robin Harvey** in Bourne; VOFC via Okeechobee 21.720 (Eng 2200-2300) 54444 at 2220 by **Chris Shorten** in Norwich.

Some days, good **17MHz (16m)** DX reception was noted. R. New Zealand's 100kW signals from Rangataiki, N.Island on 17.770 (Eng to Pacific 2200-0630) was SIO333 at 2300 in New Radnor. One morning it peaked 54444 in Norwich! Some R. Australia signals were also clearly heard here. The signal to Pacific areas via Shepparton 17.715 (Eng 2200-0530) was heard at 2300 by **Sid Morris** in Rowley Regis; to E/SE.Asia via Carnarvon 17.630 (Eng, Chin 0000-0900) 35444 at 0025 in Swanwick. The Shepparton signals to Pacific areas 17.795 (Eng, Fr 0600-0800) was 32333 at 0625 in N.London; to Asia via Darwin 17.750 (Fr, Eng 0600-0800) as 43443 at 0737 in Bridgwater.

Many broadcasts for outside Europe are in English, but those in other

DXers:
A: Leo Barr, Sunderland.
B: Darren Beasley, Bridgwater.
C: Noel Carrington, Sutton in Ashfield.
D: Jim Cash, Swanwick.
E: Bill Clark, Rotherham.
F: Antonio De Abreu-Teixeira, Durham.
G: David Edwardson, Wallsend.
H: Ron Galliers, N.London.
I: Sheila Hughes, Morden.
J: Bryan Kimber, Hereford.
K: Eddie McKeown, Co.Down.
L: Sid Morris, Rowley Regis.
M: Sergei Olejnik, Ukraine.
N: Fred Pallant, Storrington
O: Don Phillips, Bridlinmgton.
P: Johm Robertson, Alnwick.
Q: Chris Shorten, Norwich.
R: Darran Taplin, Brenchley.
S: Phil Townsend, E.London.
T: Ted Walden-Vincent, Gt.Yarmouth.
U: Jim Willett, Dollar Law.

Listeners:-
A: Kenneth Buck, Edinburgh.
B: Tim Bucknall, Congleton.
C: Noel Carrington, Sutton in Ashfield.
D: Tony Elkins, Bury St.Edmunds.
E: Ron Galliers, N.London.
F: Sheila Hughes, Morden.
G: Eddie McKeown, Co.Down.
H: George Millmore, Wootton, IOW.
I: Sid Morris, Rowley Regis.
J: Fred Pallant, Storrington.
K: Roy Patrick, Derby.
L: John Stevens, Melvick, N.Scotland.
M: Ted Walden-Vincent, Gt.Yarmouth.
N: Lee Williams, Birmingham.

Long Wave Chart

Freq kHz	Station	Country	Power (KW).	Listener
153	Bechar	Algeria	1000	J*
153	Donebach	Germany	500	A,B,C*,D,E,G*,H,J,M
153	Brasov	Romania	1200	G*
153	Engels	USSR	150	B*
162	Allouis	France	2000	A,B,C*,E,G,H,I*,J,M,N
171	Kaliningrad	Lithuania	1000	A,C*,G,H,J
177	Oranienburg	Germany	750	A,B*,D,E,G*,H,J
183	Saarlouis	Germany	2000	A,B,C*,E,F,G,H,I,J,N*
189	Motala	Sweden	300	A
198	BBC Burghead	UK	50	K
198	BBC Droitwich	UK	500	B,C*,E,F,G,H,I,M
198	BBC Westerglen	UK	50	A,K
207	Munich	Germany	500	A,B,C*,E,F,G*,H,I*,J
216	Roumoules	Monaco	1400	A,B,C*,E,F,G*,H,I*,J,N*
216	Oslo	Norway	200	A,G*
225	Konstantinow	Poland	2000	A,E,F*,G*,H,I*,J
234	Junglinster	Luxembourg	2000	A,B,C*,E,F,G,H,I,JM,N*
234	Leningrad	USSR	1000	G*
243	Kalundborg	Denmark	300	A,B,C*,E,F,H,I*,J,L,M
252	Tipaza	Algeria	1500	B*,F*,N*
252	Atlantic 252	S.Ireland	500	A,B,C*,E,F*,G,H,I,L,M,N*
261	Burg	Germany	200	E,H,N*
261	Moscow	USSR	2000	A,B,F*,I*
270	Topolna	Czech.	1500	A,C*,E,F*,G*,H,I*
279	Minsk	USSR	500	A,B*,E,G*

Note: Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

Tropical Bands Chart

Freq MHz	Station	Country	UTC	DXer
2.340	Fuzhou	China	2130	U
2.445	Nanchang	China	2212	U
2.470	R.Cacique	Brazil	0216	U
2.495	R.Madagascar	Madagascar	2030	U
2.560	Xinjiang	China	2000	G,O
3.205	AIR Lucknow	India	2047	U
3.215	R.Orange	S.Africa	2040	B
3.220	R.Togo, Lome	Togo	2135	U
3.225	RRI Tanjung Pinang	Indonesia	2239	G
3.250	RRI Banjamarsin	Indonesia	2030	U
3.255	BBC via Maseru	Lesotho	2105	B
3.270	AIR Kohina	India	1440	T
3.270	SWABC 1, Namibia	S.W.Africa	2030	O,U
3.295	Reykjavik	Iceland	2230	G,O
3.315	SLBS Freetown	Sierra Leone	2200	B,M,O
3.320	R.Orion	S.Africa	2045	A,B,M,U
3.325	R.Liberal	Brazil	0120	U
3.325	FRCN Lagos	Nigeria	2145	B,G,H,K
3.330	R.Kigali	Rwanda	2100	U
3.355	Noumea	New Caledonia	0620	U
3.365	R.Rebelde, La Julia	Cuba	0142	U
3.365	GBC Radio 2	Ghana	2130	A,B,G,H,J,K,O
3.370	R.Tezulutlan	Guatemala	0300	G
3.915	BBC Kranji	Singapore	2019	K,S,U
3.925	NSB Tokyo	Japan	0520	U
3.955	BBC Daventry	England	1945	H,I,J,K,L,O,S
3.965	RFI Paris	France	2045	H,I,J,K,O,S
3.970	RFE Munich	W.Germany	2315	J
3.980	VOA Munich	W.Germany	1820	C,H,I,J,K,L,O,S
3.985	R.Beijing, China	via SRI Berne	2115	J,K,O,Q
3.985	SRI Berne	Switz	2005	H,I,L,S
3.995	DW Cologne (Julich)	W.Germany	2121	C,H,J,K,L,O
4.000	Bofoussam	Cameroon	1900	U
4.040	R.Yerevan 1	USSR	2230	O
4.055	R.Moskva 1 (Kalinin)	USSR	1930	O
4.220	PBS Xinjiang	China	2200	C,O
4.500	Xinjiang	China	2215	G,J,O
4.600	R.Baghdad	Iraq	2000	G,O
4.635	R.Dushanbe Tadzhik	USSR	0015	M
4.719	RRI Ujung Padang	Indonesia	0612	U
4.725	BBS Rangoon	Burma	0710	U
4.735	Xinjiang	China	2200	A,D,G,H,K,O
4.755	RRI Ujungpadang	Indonesia	2130	O
4.760	Yunnan Kumming	China	2200	O
4.765	R.Rural, Santarem	Brazil	2345	F
4.765	Brazzaville	Pep.Rep Congo	2100	A,C,D,G,H,I,J,K,N,O,S,U,
4.770	FRCN Kaduna	Nigeria	2055	B,G,H,I,K,N,O,R,U
4,785	Caiari Porto Velho	Brazil	0240	U
4.785	RTM Bamako	Mali	2300	H,M
4.785	R.Baku	USSR	1828	N
4.790	TWR Manzini	Swaziland	1800	N,O
4.795	R.Nueva America	Bolivia	0300	U
4.795	R.Douala	Cameroon	1853	H,J,N,O
4.800	PBS Xinjiang	China	2204	G
4.800	AIR Hyderabad	India	0030	M
4.800	LNBS Lesotho	Maseru	1820	N,U
4.805	R.Nac.Amazonas	Brazil	2250	F,H
4.810	R.Orion, Jo'burg	S.Africa	2000	U
4.810	R.Yerevan 2	USSR	2230	H,K,O
4.815	R.diff TV Burkina	Ouagadougou	1917	K,U
4.820	R.Moskva 4 (Khanty-M)	USSR	1855	F,K,N
4.825	R.Moscow	USSR	1855	K,N,O
4.830	Gaborone	Botswana	2152	C,H
4.830	R.Bangkok	Thailand	0520	U
4.830	R.Tachira	Venezuela	2300	F,G,H
4.832	R.Reloj	Costa Rica	0400	O
4.832	Altai	Mongolia	2205	U
4.835	ABC-Alice Springs	Australia	0518	U
4.835	R.Tezulutlan, Coban	Guatemala	0300	G
4.835	RTM Bamako	Mali	2100	H,K,N,O
4.845	R.Cabocla, Manaus	Brazil	0114	U
4.845	RRI Ambon	Indonesia	0620	U
4.845	ORTM Nouakchott	Mauritania	2143	F,K
4.850	R.Yaounde	Cameroon	2100	G,H,I,J,K,N,O,R
4.855	R.Sana Yemem	Yemen	0420	U
4.860	EP da Lunda-Sul	Angola	1916	U
4.860	AIR New Delhi	India	1700	O
4.865	PBS Lanzhou	China	2057	G,N
4.870	R.Cotonou	Benin	2055	A,H,O
4.870	SLBC Colombo	Sri Lanka	0010	M
4.875	Super R.Roraima	Brazil	0041	F
4.880	AIR Lucknow	India	2024	U
4.885	R.Clube do Para	Brazil	2200	F,G
4.885	Voice of Kenya	Kenya	1855	N
4.890	RFI Paris	via Gabon	0000	M,O
4.890	R.Port Moresby	New Guinea	0612	U
4.890	ORTS Dakar	Senegal	2300	H
4.895	Voz del Rio Arauca	Colombia	0050	F
4.895	AIR Kurseong	India	0010	U
4.895	R.Moscow (Kalinin)	Lithuania	2050	H,K,N
4.895	R.Moskva 4 (Tyumen)	Siberia	2230	O
4.900	V. of the Strait 2	China	1630	M
4.900	V de la Rev.Conakry	Guinea	2200	G
4.900	SLBC Colombo	Sri Lanka	0619	U
4.905	R.Relogio, Rio	Brazil	2316	F
4.905	R.Nat.N'djamena	Chad	1857	H,I,N,U
4.910	R.Zambia, Lusaka	Zambia	2000	U
4.915	R.Anhanguera	Brazil	2330	G,M
4.915	R.Ghana, Accra	Ghana	2000	B,E,G,H,I,N,O
4.915	Voice of Kenya	Kenya	1832	N,U
4.920	R.Quito	Ecuador	0139	U
4.925	R.Nacional, Bata	Eq.Guinea	2200	U
4.930	R.Moscow	USSR	2156	C,K
4.935	Voice of Kenya	Kenya	1832	A,B,H,N,O,P,R
4.940	V of Strait, Fuzhou	China	0220	U
4.940	R.Kiev 2	Ukraine	2100	C,G,H,I,K,N,O
4.945	R.Nac.Porto Velho	Brazil	0120	U
4.958	R.Baku	USSR	2000	F,O
4.970	R.Rumbos, Caracas	Venezuela	0100	U
4.975	R.Uganda, Kampala	Uganda	1900	M,O,R
4.980	Ecos del Torbes	Venezuela	2318	K,U
4.990	FRCN Lagos	Nigeria	2300	E,K,O
4.990	R.Ancash, Huaraz	Peru	0215	U
4.990	R.Moscow (Yerevan)	USSR	0017	K
5.000	YVTO Caracas	Venezuela	0200	U
5.005	R.Nacional, Bata	Eq.Guinea	2010	U
5.010	R.Garoua	Cameroon	1835	N
5.010	R.Malagasy	Madagascar	2110	U
5.010	SBC Singapore	Singapore	0516	U
5.020	R.Nacional,Caracas	Venezuela	0147	U
5.030	R.Catolica, Quito	Ecuador	2330	O,U
5.035	R.Bangui	C.Africa	2055	G,H
5.035	R.Alma Ata	USSR	2130	K,O
5.040	Vos del Upano, Macas	Ecuador	0110	F,U
5.045	R.Cultura do Para	Brazil	2210	F,G,K,M
5.047	R.Togo, Lome	Togo	1850	H,K,N,O
5.050	AIR Aizawal	India	2005	U
5.050	SBC Singapore	Singapore	2215	G,H,O
5.055	RFO Cayenne(Matoury)	Fr. Guiana	0435	I,K
5.055	TWR Manzini	Swaziland	0330	F,O
5.060	PBS Xinjiang	China	2200	G,O
5.075	Caracol Bogata	Colombia	2240	F,U
5.260	R.Alma Ata 2	USSR	2100	B,K,O
5.290	R.Moskva 1Krasnoy'k	USSR	0310	U
5.800	PBS Xinjiang	China	2335	I

languages can often be identified by the preceding brief musical signature. Those noted came from Vatican R, Rome 17.630 (Eng to Africa 0630-0700) 44444 at 0630 in Morden; KHBI, N. Mariana Is 17.555 (Eng to Asia 0800-1000) SIO223 at 0820 in Macclesfield; R.Beijing, China 17.710 (Eng to S.Pacific 0900-1100) heard at 0900 in Bridlington; DW via Julich 17.780 (Eng to Australia, N. Zealand 0900-0950) SIO444 at 0924 in Rotherham and 17.830 (Ger to W.Africa 2000-2200) 43333 at 2000 in Bourne; SRI via Schwarzenburg 17.670 (It, Eng, Ger, Fr to Pacific 0800-1030) SIO222 at 1015 by **Francis Hearne** in Bristol, 17.830 (Eng to M.East, Africa 1530-1600) 53354 at 1532 in Co.Down and 44444 at 1549 in Oman; R.Tunis via Sfax 17.500 (Ar 0700?-1600) SIO444 at 1420 in Winchester; RSA Johannesburg 17.790 (Eng to W.Africa 1700-1800) 44554 at 1700 in Alnwick; WWCR 17.525 (Eng to USA 1500-2000) heard at 1900 in Derby; V. of Israel, Jerusalem 17.630 (Eng to Africa 1900-1930) SIO455 at 1905 in Edinburgh; BRT 17.550 (Eng to Africa 2100-2125) 53333 at 2103 by **Charles Beanland** in Gibraltar.

A few evening broadcasts to Europe were logged: RHC, Cuba 17.815 (Fr, Eng 1900-2100) SIO433 at 2030 in Hereford; HCJB Quito 17.790 (Cz, Ger, Sw, Eng, Sp 1800-2230) 33344 at 2132 by **Chris Bazley** in Rayleigh; VOFC via Okeechobee 17.750 (Eng to Europe 2200-2300) SIO444 at 2200 in Sheffield; V. of the UAE in Abu Dhabi 17.855 (Eng 2200-0000) 45554 at 2340 in Wallsend.

R. New Zealand Int. has returned to the **15MHz (19m)** band to reach the Pacific areas, because many of their receivers do not cover the 22m band. They now operate on 15.120 (Eng to Pacific 1800-2200). Some evenings they were heard here. In New Radnor they were SIO333 at 1900. Some of R. Australia's Shepparton signals have also been heard here: 15.240 (Eng to Pacific areas 2200-0930) heard at 2200 by **Tim Bucknall** in Congleton; 15.320 (Eng to Asia 2030-0800) 34433 at 0615 in Wallsend; 15.160 (Eng to Pacific 2130-1100) as 42222 at 2131 in Swanwick.

Most 19m signals to Europe reach their target well. A typical rating for R.Japan via Yamata 15.325 (Eng 0700-0800) was SIO433 at 0730 in Hereford; UAE R.Dubai 15.435 (Eng 1330-1400)

Listener:
A: Leo Barr, Sunderland.
B. Darren Beasley, Bridgwater.
C: Tim Bucknall, Congleton.
D: Noel Carrington, Sutton in Ashfield.
E: Jim Cash, Swanwick.
F: Bill Clark, Rotherham.
G: Tony Elkins, Bury St.Edmunds.
H: Ron Galliers, N.London.
I: Alf Gray, Birmingham.
J: Francis Hearne, Bristol.
K: Sheila Hughes, Morden.
L: Rhoderick Illman, Thumrait, Oman.
M: Robert Lawrence, Cheltenham.
N: Eddie McKeown, Co.Down.
O: George Millmore, Wootton IOW.
P: Sid Morris, Rowley Regis.
Q: John Parry, Northwich.
R: Roy Patrick, Derby.
S: John Robertson, Alnwick.
T: John Stevens, Melvick, N.Scotland.
U: Phil Townsend, E.London.
V: Ted Walden-Vincent, Gt.Yarmouth.
W: Lee Williams, Birmingham.

Medium Wave Chart

Freq kHz	Station	Country	Power (kW)	Listener
531	Ain Beida	Algeria	600	B*,H*
531	Leipzig	Germany	100	B*,C*,N*,O
531	Oviedo	Spain	10	B*,N*,O
531	Beromunster	Switz	500	T,W*
531	Cheboksary	USSR	30	C*
540	BRT-2 Wavre	Belgium	150/50	B*,C,D,H,N*,O,P*,U
540	Solt	Hungary	2000	N*
540	Sidi Bennour	Morocco	600	B*,H*
549	Les Trembles	Algeria	600	B*,H*,O
549	DLF Bayreuth	Germany	200	B*,D,G,H,N*,O,U
549	Nordkirchen	Germany	100	P*
549	Thurmau	Germany	200	G
549	Moscow	USSR	100	C*,T*
558	Espoo	Finland	100	B*
558	Valencia	Spain	20	B*,D,N*,W
567	Berlin	Germany	100	B*,H*,N*
567	RTE-1 Tullamore	Ireland (S)	500	B*,C,D,G,H,O,P,U
567	Volgograd	USSR	250	N*
576	Muhlacker	Germany	500	H
576	Stuttgart	Germany	500	B*,N*,O
585	FIP Paris	France	8	G,H,O,U
585	RNE-1 Madrid	Spain	200	B*,N*,P*,W*
594	Frankfurt	Germany	400	B*,G,H*,N*,O,U
594	Muge	Portugal	100	B*
594	Izhevsk	USSR	100	C*
594	Zagreb	Yugoslavia	20	G*
603	Lyon	France	300	B*,C*,D
603	BBC-R4 N'castle	UK	2	C,D,N
612	Kiel	Germany	10	G
612	RTE-2 Athlone	Ireland (S)	100	B*,C,D,O,P,U,V,W*
612	Tallinn	USSR	100	C*
621	RTBF-1 Wavre	Belgium	80	B*,D,H,N*,O,P*,U
630	Vigra	Norway	100	B*,N*
630	Tunis-Djedeida	Tunisia	600	H*
639	Liblice	Czech	1500	B*,H*
639	La Coruna	Spain	100	B*,N*,P,W*
648	BBC Orfordness	UK	500	C,D,H,N*,O,P,U,V
657	Burg	Germany	250	B*,N*
657	RCE-2 Madrid	Spain	20	H*
657	BBC-R.Wales Wrexham	UK	2	B*,D,M,P*
666	Bodenseesender	Germany	300/180	B*,C*,G*,N*
666	Barcelona	Spain	20	N*
675	Marseille	France	600	B*,H*,P
675	Hilversum-3 Lopic	Holland	120	B*,C,D,G,H,N*,O,U,V
684	RNE-1 Sevilla	Spain	250	B*,H*,N*
693	Berlin	Germany	250	N*
702	Aachen/Flensburg	Germany	5	B*,N*
702	Zamora	Spain	5	B*,K*
711	Tallinn	Estonia	50	C*
711	Rennes 1	France	300	B*,H,K,N*,O,U
720	Langenberg	Germany	200	B*
720	BBC-R4 Lisnagarvey	Ireland (N)	10	C
720	Norte	Portugal	100	N*
720	BBC-R4 Lots Rd London	UK	0.5	B*,C,D,M,O
729	Leipzig	Germany	5	C*
729	RTE-1 Cork	Ireland (S)	10	A*,B*,D,N*,O
729	Oviedo	Spain	50	B*,K*,N*
738	Paris	France	4	A*,O,V
738	Poznan	Poland	300	B*
738	RNE-1 Barcelona	Spain	250	A*,B*,K*,N*,W*
747	Hilversum-2 Flevo	Holland	400	B*,D,G,H,K, N*,O,P,U,V
756	Brunswick	Germany	800/200	B*,G*,H,K*,N*
756	Ravensburg	Germany	100	G*
756	Bilbao	Spain	5	K*
756	BBC-R4 Redruth	UK	2	D,O
765	Sottens	Switz	500	B*,N*
774	BBC-R4 Enniskillen	Ireland (N)	1	N
774	RNE-1 San Sebastian	Spain	60	B*
783	Djanet	Algeria	5	A*
783	Burg	Germany	1000	B,K*,N*
792	Limoges	France	300	B*,N*,O
792	Sevilla	Spain	20	B*,K*
792	Al-Hiswah	Yemen	750	L
801	Munich	Germany	420	B*,H*,N*
810	Berlin	Germany	5	G*
810	SER Madrid	Spain	20	B*,G*,N*
810	BBC-Scot.Westerglen	UK	100	C,N,O,P
819	Bordeaux	France	20	B*
828	Hanover	Germany	100/5	B*
837	Nancy	France	200	B*,N*,O
846	Rome	Italy	540	B*,H*,N*,O,P*
846	Moscow	USSR	50	C*
855	Berlin	Germany	100	A*,B*,N*
855	Murcia	Spain	125	B*,D,N*
864	Paris	France	300	B*,O,U
873	AFN via Frankfurt	Germany	150	B*,E*,G,N*,P*,W*
873	R.Ulster,Enniskillen	UK	1	C,N
882	BBC-Wales Washford	UK	70	B*,C,D,G,H,J,M,N,O,P
891	Algiers	Algeria	600/300	B*,C*,H*,N*,P,W*
891	Hulsberg	Holland	20	B*,G,N*,O
900	Milan	Italy	600	A*,B*,C*,H,N*,W*
909	BBC-R5 Moorside Edge	UK	200	D
918	R.Intercont. Madrid	Spain	20	B*,N*
927	BRT-1 Wolvertem	Belgium	300	B*,D,H,N*,O,P*,U
936	Bremen	Germany	100	B*,C*,G*,N*,W*
945	Toulouse	France	300	B*,N*
954	RCE Madrid	Spain	20	B*
963	Pori	Finland	600	B*,N*
972	Hamburg	Germany	300	B*,D*,G*,H,N*
972	Nikolayev	USSR	500	G*
981	Alger	Algeria	600/300	B*,D*,H,N*
981	Ceske Budejovice	Czech	30	C*
990	Berlin	Germany	300	B*,H,N*
990	SER R.Bilbao	Spain	10	H
990	BBC-Redmoss	UK	1	B*
990	BBC-Tywyn	UK	1	N
999	R.Popular, Madrid	Spain	20	B*,H,N*
999	Kishinev	USSR	100	A*
1008	Hilversum-5 Flevo	Holland	400	A,B*,D*,H,O,P*,U
1017	Rheinsender	Germany	600	C*,D*,G*,H,N*
1044	Dresden	Germany	250	D*,H*,N*
1044	Sebaa-Aioun	Morocco	300	H*
1053	Zarogoza	Spain	10	H*
1062	Kalundborg	Denmark	250	H*,N*,W*
1071	Brest	France	20	N*,O
1071	Lille	France	40	H*
1071	Riga	Latvia	50	C*
1080	Katowice	Poland	1500	H*
1089	BBC-R1 Moorside Edge	UK	150	C,D
1089	Krasnodar	USSR	300	H*,N*
1089	Weimar	Germany	20	N*
1098	Bratislava	Czech	750	G,H*,N*
1098	RNE-5	Spain	10	D,N*
1107	AFN via Munich	Germany	40	D,F*,G*,N*
1107	BBC-R1 Wallasey	UK	0.5	C
1116	Bari	Italy	150	H*,N*
1125	La Louviere	Belgium	20	O
1125	Stara Zagora	Bulgaria	500	N*
1125	RNE 5	Spain	10	H*,N*
1125	BBC Llandrindod Wells	UK	1	M
1134	Zadar	Yugoslavia	1200	B*,C*,D,E*,H*, K*,N*,O,R*
1143	AFN via Stuttgart	Germany	10	A,N*,P*
1143	Century R. Dublin	Ireland (S)	?	N*,S*
1143	Kaliningrad	Lithuania	150	W*
1161	Strasbourg (F.Int)	France	200	H*,N*
1179	Santiago	Spain	10	H*,N*
1179	Solvesborg	Sweden	600	D,H*,N*,O,P*,W*
1188	Kuurne	Belgium	5	A*,O
1188	Szolnok	Hungary	135	H*,N*
1188	Al-Hiswah	Yemen	400	L
1197	VOA via Munich	Germany	300	D,H*,N*,P*
1197	BBC-R3 Enniskillen	Ireland (N)	1	N
1197	BBC-R3 Bournemouth	UK	0.5	O
1197	Minsk	USSR	50	C*,N*
1206	Bordeaux	France	100	A*,D,N*
1206	Wroclaw	Poland	200	H*
1215	BBC-R3 Lisnagarvey	UK	10	N*
1233	Melnik	Czech	400	H*,N*
1242	Marseille	France	150	N*
1251	Huisberg	Neth'lands	10	N*
1260	Valencia	Spain	20	H*,N*
1269	Neuminster	Germany	600	H*,D,G*,N*,P*,W*
1278	Strasbourg	France	300	H*,N*
1278	RTE-2 Dublin/Cork	Ireland (S)	10	C,J*,M,N*,P
1287	Litomysl/Liblice	Czech	300/200	H*
1296	Kardzali	Bulgaria	150	D
1296	BBC Orfordness	UK	500	E*,N*
1305	Rzeszow	Poland	100	H*
1305	Orense (RNE5)	Spain	5	N*
1314	Kvitsoy	Norway	1200	D,H,N*,O,P*,V,W*
1323	BBC Zyyi	Cyprus	50	A*
1323	R.Moscow via Leipzig	Germany	150	H*,N*,P*
1332	Rome	Italy	300	D,H*,N*
1341	BBC-Ulst.Lisnagarvey	Ireland (N)	100	D,H*,O
1350	Nancy/Nice	France	100	D,H*,N*
1359	Berlin	Germany	250/100	N*
1368	Manx R., Foxdale	IOM	20	C,D,N*
1377	Lille	France	300	C*,N*,O,P*,U
1386	Kaliningrad	Lithuania	500	D,H*,N*,O
1395	R.Tirana via Lushnje	Albania	1000	D*,K*,N*
1404	Brest	France	20	N*,O
1413	RCE Zaragoza	Spain	20	D*,H*,N*
1422	Heusweiler	Germany	1200/600	D*,G*,H*,N*,P*
1431	Dresden	Germany	250	N*
1440	Marnach	Lux'bourg	1200	D*,K*,N*,O,P*
1449	Berlin	Germany	5	N*
1449	Squinanzo	Italy	50	N*
1467	TWR Monte Carlo	Monaco	1000/400	D*,H*,K*,N*,P*
1476	Wien-Bisamberg	Austria	600	N*,P*
1494	Amman	Jordan	?	L
1494	Leningrad	USSR	1000	D*,H*,N*,P*
1503	Stargard	Poland	300	H*,K*,N*,P*
1512	BRT Wolvertem	Belgium	600	E*,H*,I*,K*, N*,O,P*,U
1521	Cizatice	Czech	?	N*
1521	Kosice	Czech	600	N*
1530	Vatican R., Rome	Italy	150/450	H*,K*,N*,P*
1539	Mainflingen	Germany	700	D*,H*,N*,P*
1566	Sarnen	Switz	300	H*
1575	Burg	Germany	250	N*,W*
1593	Langenberg	Germany	400/800	C*,D*,G*, K*,N*,P*,W*
1611	Vatican R., Rome	Italy	5	N*,Q*

Note. Entries marked * were logged during darkness. All other entries were logged during daylight or at dawn/dusk.

SIO444 at 1330 in Edinburgh; Voice of Israel, Jerusalem 15.617 (Heb 0400-2310, to USA) SIO444 at 1335 in Winchester and 15.640 (Heb, Fr, Russ, Eng, Yid 1800-2225) SIO333 at 1925 by **Alf Gray** in Birmingham; RNB, Brazil 15.265 (Eng, Ger 1800-?) 32432 at 1950 in Alnwick; VOA via Tangier 15.205 (Eng 1700-2200) 43333 at 1915 in Morden; WWCR Nashville 15.690 (Eng, Sp 1200-0000) at 1920 in Derby; RCI via Sackville 15.325 (Eng 1900-1959) at 1900 in Bridlington; Voice of Vietnam, Hanoi 15.010 (Eng, Fr, Sp, Ger 1800-2130) 44444 at 1942 in Sunderland; R.Denmark via RNI Oslo 15.235 (Da 1930-2000) 53553 at 1942 in Bridgwater; SLBC Colombo, Sri Lanka 15.120 (Eng 1830-2130) SIO433 at 2030 in Sheffield; R.Beijing, China 15.100 (Fr 1830-2130, also to Africa) 54444 at 2051 in Gibraltar; R.Korea, Seoul 15.575 (Eng 2030-2130) SIO232 at 2110 in Bishops Stortford; WCSN Scotts Corner 15.665 (Eng 2000-2200) 43333 at 2118 in N.London; Voice of the UAE in Abu Dhabi 15.305 (Eng 2200-0000) 55555 at 2225 in Norwich; RTVM Tanger, Morocco 15.335 (Ar, Sp 0945-0100, also to W.Africa) 43333 at 2330 in Durham.

Those to other areas include RTL Luxembourg 15.350 (Eng, Fr to E.USA 24hrs) 34333 at 0530 in Oman; R.Romania Int, Bucharest 15.335 (Eng to Pacific areas 0645-0715) SIO322 at 0715 in Bristol; SRI via Schwarzenburg 15.570 (Eng, Fr, Ger, It to Pacific, Asia 1100-1300) 43343 at 1105 in Co.Down; R.Tashkent, Uzbek 15.470 (Eng to S.Asia 1330-1400) 45333 at 1330 in Brighton; R.Portugal Int, Lisbon 15.425 (Eng to M. East, India 1600-1630) SIO444 at 1630 in Macclesfield; R.Nederlands via Talata Volon 15.570 (Eng to C/S.Africa 1830-1925) SIO434 at 1846 in Rotherham; AIR via Bangalore 15.265 (Eng to Pacific 2045-2230) 34433 at 2105 in Brenchley; BBC via Ascension Is 15.260 (Eng to S. Am 2000-0330) 33323 at 2220 in Bourne; R. Korea, Seoul 15.575 (Eng to E.USA 0000-0100) at 0000 in Rowley Regis.

Although for other areas, R. Australia's **13MHz (22m)** signals often reach the UK. The Shepparton signals to Pacific areas 13.605 (Eng 1700-2130) were SIO433 at 1700 in Birmingham; to S.Asia via Carnarvon 13.775 (Eng 1530-2100) was 52333 at 1820 in Swanwick.

Some broadcasts in this band come from DW via Julich 13.790 (Eng to W.Africa 0600-0650) 33233 at 0645 in N.London; WSHB Cypress Creek 13.760 (Eng to Australia 0800-1000) SIO111 at 0808 in Macclesfield; SRI via Sottens 13.635 (Eng, Fr, Ger, It to Pacific areas, Asia 1100-1430) 44344 at 1106 in Co.Down; R.Austria Int, Moosbrunn 13.730 (Ger, Fr, Eng, Sp, Ar to Europe 0400-1655) SIO233 at 1405 in E.London and 13.730 (Ger, Fr, Eng, Sp to Africa 1700-2100) 44344 at 1945 in Bourne; R.Pakistan, Islamabad 13.665 (Eng to M.East 1600-1630) at 1600 in Bridlington; UAE R.Dubai 13.675 (Eng to Europe 1600-1640) 23442 at 1632 in Wallsend; KHBI Saipan, N.Mariana Is 13.625 (Eng to S.Asia 1400-1800) SIO322 at 1640 in Rotherham; BRT via Wavre 13.675 (Eng to Europe 1730-1755) 42322 at 1732 in Oman; RCI via Sackville 13.670 (Eng, Fr to Africa 1800-2000) 11431 at 1810 in Bridgwater; BBC via Woofferton 13.660 (Ar to N.Africa 2000-2100) 54444 at 2042 in Gibraltar; WHRI 13.760 (Eng to USA, Europe 1600-0000) SIO444 at 2200 in Edinburgh; Voice of the UAE, Abu Dhabi 13.605 (Ar, Eng to N.Africa 2200-0000) 34343 at 2315 in Rayleigh.

The **11MHz (25m)** signals to Europe include HCJB Quito 11.835 (Eng 0700-0830) 44444 at 0735 in Alnwick; WCSN Scotts Corner 11.705 (Eng 0800-1000) 33333 at 0813 in Rayleigh; UAE R.Dubai 11.795 (Eng 1600-1640) 33423 at 1635 in Sunderland; R.Pakistan, Islamabad 11.570 (Ur, Eng 1700-1800) SIO444 at 1740 in Macclesfield; R.Finland via Pori 11.755 (Eng 1830-1900) in Bridlington; REE via Aganda 11.790 (Eng 1900-2000) SIO322 at 1900 in Birmingham; R.Damascus, Syria 12.085 (Eng 2005-2105, to USA) SIO332 at 2028 in Rotherham; R.Romania Int, Bucharest 11.940 (Eng 2100-2125) 55555 at 2100 in Brenchley; R.Yugoslavia, Belgrade 11.735 (Eng 2100-2145) 53233 at 2110 in Bishops Stortford; R.Beijing, China 11.500 (Eng 2000-2200) 34343 at 2146 in Swanwick; AIR via Aligarh 11.620 (Hi, Eng 1845-2230) SIO444 at 2200 in Sheffield; R.Sofia, Bulgaria 11.660 (Eng 2200-2230) heard by **Peter Vlietinck** in Royston; Voice of Turkey, Ankara 11.710 (Eng 2200) heard at 2200 in Hereford; R.Japan via Moyabi 11.735 (Eng 2300-0000), at 2300 by **Julian Wood** in Elgin; R.Vilnius, Lithuania 11.790 (Eng 2300) 44554 at 2306 in Wallsend.

Some mornings the **9MHz (31m)** signals from R. New Zealand to Pacific areas have reached us. Their broadcast on 9.700 (Eng 0630-1110) was 24333 at 0730 in Norwich. Later, R. Australia's Carnarvon broadcast to Asia 9.860 (Eng 1800-2100) was heard here. In Bishops Stortford it rated SIO222 at 2057. At least 3 signals from S.America may also be heard here: R.Sucesos, Tariba, Venezuela 9.700, rated 55555 at 2255 by **Tony Elkins** in Bury St Edmunds; R.Nacional, Paraguay 9.735 (Sp to S.Am 0800-2300), logged as 34543 at 2301 in Wallsend; R.Universo, Curitiba, Brazil 9.565 (Port to S.Am 0900-0200) which peaked 43333 at 0045 in Durham.

The 31m signals to Europe include AWR via Sines 9.670 (Eng 0800 Sun only) 44444 at 0800 in Morden; R.Nederlands via Flevo 9.715 (Eng 1130-1225) SIO555 at 1155 in Hereford; R.Tirana, Albania 9.585 (Eng 1530-1600) 43444 at 1530 in Brighton; VOIRI Tehran 9.022 (Eng, Fr, Ger, Sp, Ar 1800-2230) 54454 at 1922 in Swanwick; R.Sweden via Horby 9.655 (Fr, Sp, Eng, Ger, Sw 1900-2130) 44444 at 1950 in Brenchley; Voice of Turkey, Ankara 9.445 (Eng 2000-2030) 32433 at 2010 in Co.Down; R.Pyongyang, N.Korea 9.325 (Sp 2000-2050) 22232 at 2035 in Sunderland; R.Kiev, Ukraine 9.865 (Eng 2100-2200) SIO433 at 2100 in Sheffield; R.Beijing, China 9.880 (Eng 2200-?) 54554 at 2200 in Bridgwater; R.Sofia, Bulgaria 9.700 (Eng 2200-?) SIO333 at 2230 in Bristol.

Among the **7MHz (41m)** logs were WHRI 7.315 (Eng to E.USA 0000-1100) SIO333 at 0631 in Macclesfield; WYFR 7.355 (Eng to Europe 0600-0800) 33443 at 0710 in N.London; AIR via Aligarh 7.412 (Eng to Europe 1830-1945) SIO444 at 1830 in Winchester; R.Japan via Moyabi 7.140 (Eng to S.Africa 1900-1930) SIO333 at 1915 in Hereford; R.Korea, Seoul 7.550 (Kor, Ar, Eng to M. East, Africa 1700-2130) 34333 at 1748 in Oman and 44444 at 2055 in Norwich.

Three **6MHz (49m)** signals from S.America were heard: Brasilia, Brazil 6.180 (Port 0900-0100) at 2235 by **Sergei Olejnik** in Kalush, Ukraine; R.Globo Rio, Brazil 6.030 (Port 0900-0400) SIO343 at 2308 in New Radnor; R.Nac. Buenos Aires, Argentina 6.060 (Sp 0100-1100) 22222 at 0055 in Durham.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
850	WHDH	Boston, MA	0300	A
950	WPEN	Philadelphia, PA	0405	A
970	WYNZ	Portland, ME	0450	A
1020	KDKA	Pittsburg, PA	0255	A
1050	WEVD	New York, NY	0215	A
1090	WBAL	Baltimore, MD	0150	A
1200	WKOX	Framingham, MA	0520	A
1220	WKNR	Cleveland, OH	0420	A
1430	WENE	Endicott, NY	0350	A
1470	WLAM	Lewiston, MA	0230	A
1520	WWKB	Buffalo, NY	0230	A
		Canada		
590	VOCM	St.John's, NF	0150	A
620	CKCM	Grand Falls, NF	0210	A
640	CBN	St.John's, NF	0420	A
670	CKXB	Musgravetown, NF	0100	A
750	CBGY	Bonavista Bay, NF	0430	A
910	CHRL	Roberval, PQ	0400	A
920	CJCH	Halifax, NS	0155	A
930	CJYQ	St.John's, NF	0020	A
1050	CHUM	Toronto, ON	0150	A
1140	CBI	Sydney, NS	0420	A
1200	CFGO	Ottawa, ON	0230	A
1220	CKCW	Moncton, NB	0150	A
1320	CKEC	New Glasgow, NS	0300	A
1380	CFDA	Victoriaville, PQ	0220	A
1410	CKSL	London, ONT	0350	A
1470	CHOW	Welland, ON	0400	A
		C. America & Caribbean		
1100	ZDK Granville R.	St.Johns, Antigua	0420	A
1190	WBMJ	San Juan, Puerto Rico	0150	A
1420	ACB 20	Panama	0600	A
1570	Atlantic Beacon	Turks & Caicos Ils	0200	A?
1610	Caribbean Beacon	The Valley, Anguilla	0100	A
		South America		
1100	R.Globo	Sao Paulo, Brazil	0540	A
1280	ZYJ455 R.Tupi	Rio, Brazil	0455	A
1380	CB138 R.Colo Colo	Santiago, Chile	0410	A
1420	HJBH Caricol	Santa Marta, Colombia	0545	A
1520	Ecos del Tomar	Bogota, Colombia	0555	A

DXers
A: Jim Willett, while at Dollar Law, Scotland.

EQUIPMENT USED

Leo Barr, Sunderland: Matsui MR-4099 + r.w. in loft.
Chris Bazley, Rayleigh: Panasonic RBF-40L + 20m wire
Charles Beanland, Gibraltar: Sangean ATS-803 + a.t.u. + r.w.
Darren Beasley, Bridgwater: Philips D2935 + loop or a.t.u. + 10m wire.
Kenneth Buck, Edinburgh: Lowe HF-225 + r.w. in loft or loop.
Tim Bucknall, Congleton: Triumph 100D or Unitra D-401 or Boots SRR 33T.
Noel Carrington, Sutton in Ashfield: Philips D2999 + r.w.
Jim Cash, Swanwick: Kenwood R5000 + trap dipole.
Bill Clark, Rotherham: Sony ICF-SW-7600 + built-in whip or r.w.
John Coulter, Winchester: Yaesu FRG-7 + r.w.
Antonio De Abreu-Teixeira, Durham: Sony ICF-2001D or ICF-SW 7600 + 9.5m wire.
David Edwardson, Wallsend: Trio R-600 + inverted V trap dipole.
Tony Elkins, Bury St.Edmonds: Icom R-9000 + a.t.u. + 2 co-phased 5RV.
David Forester, Newcastle-under-Lyme: Yaesu FRG-7 + r.w.
Ron Galliers, London: Philips D2935 + a.t.u. + 30m wire.
Alf Gray, Birmingham: Codar CR70 + PR30 + a.t.u. + Ex-Army whip.
Simon Hamer, New Radnor: Lafayette HE30/Grundig S1400/Sony ICF-2001D + a.t.u. + r.w. or loop.
Robin Harvey, Bourne: Matsui MR-4099 + s.w. loop.
Francis Hearne, Bristol: Sharp GFA3 cassette radio + r.w.
Sheila Hughes, Morden: Sony ICF-7600DS; Panasonic DR48 + 15m wire.
Rhoderick Illman, Thumrait, Oman: Sony ICF-7600DS + whip or 23m wire
Cyril Kellam, Sheffield: Sony ICF-7600DS + AN-1 or 25m wire.
Bryan Kimber, Hereford: Zenith R7000 or Realistic SX190 + 20m wire.
Robert Lawrence, Cheltenham: Hitachi cassette radio + 20m wire.
Eddie McKeown, Co.Down: Tatung TMR-7602.
George Millmore, Wootton, IOW: Tatung TMR-7602 + loop or Racal RA17L + v.l.f. converter + r.w.
Sid Morris, Rowley Regis: Kenwood R5000 + 31m wire.
John Nash, Brighton: Kenwood R5000 + Datong AD370.
Sergei Olejnik, Kalush, Ukraine: Ishim-003 + 70m wire.
Fred Pallant, Storrington: Trio R2000 + r.w. in loft.
John Parry, Northwich: Realistic DX-400 + 33m wire.
Roy Patrick, Derby: Lowe HF-125 + 44m wire.
Don Phillips, Bridlington: Yaesu FRG-8800 + a.t.u. + r.w.
Philip Rambaut, Macclesfield: Int.Marine Radio R.700M + r.w.
John Robertson, Alnwick: Lowe HF-225 + E/W r.w.
John Sadler, Bishops Stortford: Realistic DX-400 + SW Loop.
Chris Shorten, Norwich: Matsui M- 4099 + 10m wire.
John Stevens, while in Melvick, N.Scotland: Icom R-70 + r.w.
Darran Taplin, Brenchley: Yaesu FRG-7700 + FRA-7700 or FRT-7700 + Zepp.
Phil Townsend, London: l.f. converter + Lowe SRX-30 + loop or a.t.u. + r.w.
Ted Walden-Vincent, Gt.Yarmouth: Grundig Satellit 1400L + r.w.
Jim Willett, Dollar Law, Scotland: See m.w. transatlantic DX text.
Lee Williams, Birmingham: Sony ICF-2001D + built-in whip.
Julian Wood, Elgin: Kenwood R2000 + Yaesu FRT-7700 a.t.u. + 6m wire.

watching brief

Andy Emmerson G8PTH
71 Falcutt Way, Northampton NN2 8PH

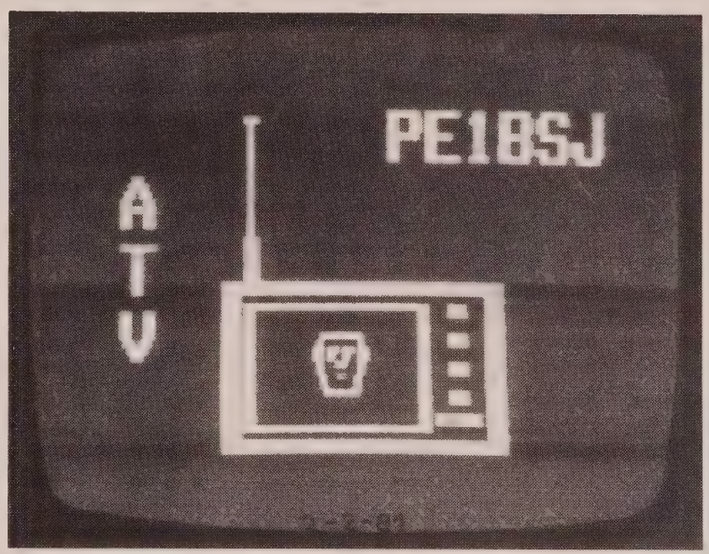
We continue our beginner's guide to amateur television equipment and techniques, starting off with ways of producing pictures.

Video Sources

From a transmitting viewpoint, virtually any video device is ideal for amateur television, so long as it puts out a clear picture. Because of the additional cost of the transmitting apparatus, most ATVers have to consider their budgets and may not spend a fortune on the camcorders that some video enthusiasts might consider first. ATVers are also good at getting bargains and seeking out and refurbishing second-hand equipment, so not everyone uses the latest model. Overall, the VHS format has the popularity edge on 8mm, and the compact size of the VHS-C camcorders has made them the favourite with recent purchasers.

People from a professional background prefer the stability of the shoulder-mount full-size VHS cameras, and there are plenty of second-hand bargains among these. Of course, you have to ask for them - any dealer would prefer to sell you a new machine but usually has some trade-ins which he'll sell. Cheaper than all the foregoing options are old black-and-white surveillance cameras, which often give a better picture than any colour device. At rallies they should not cost more than £20 or £25, though you may have to pay extra for a decent lens. Quite few people place a surveillance camera on a wall bracket (just like the surveillance cameras in shops): if this is aimed looking down on the operating position in the shack, you can be seen while you talk to your QSO partners.

There are other ways of generating pictures apart from cameras. One way is to use a home computer, but this may have problems. Not all computers produce a TV picture to the normal broadcast standards and any displays involving small text will probably not be easy to make out 'at the other end'. In any case, computer graphics look pretty boring after 30 seconds, nothing like a live camera picture. People also build test signal and caption generators from integrated circuits: these are compact and handy. The so-called Cropredy design can be had from Cirkit and there are also third-party add-ons and programmed chips available for this.



If a camera is unavailable, a home computer can be pressed into service as a picture source. Simple graphics can be quite effective, as in this picture from Holland, but fine detail will be lost in weak signals and any static display soon gets boring.

ATV on the Cheap

Surprisingly perhaps, the lowest cost entry to amateur television is at 10GHz (also known as 3cm or X-Band). Although this is microwave territory, almost as high in frequency as satellite TV, the 'fall-out' from this satellite market has made this the cheapest band to choose. An added bonus is that the equipment is extremely compact and uses flea power, a truly eco-friendly band!

Of course, the activity on this band is confined to places where there is a 3cm repeater and some keen types who take their equipment to hilltops for portable operation. So far, we have 3cm TV repeaters only in Milton Keynes and near Burton-on-Trent, but others are proposed in Bristol and Northampton. Looking a little further, it is highly likely that 3cm will become the band for amateur television and I expect every district to have a 10GHz repeater in ten years time.

Why is this? Simply because whole system is cheap and attractive, while avoiding the problems of other ATV bands. The 430MHz band is most people's first choice, but it is crowded and quite expensive to equip yourself for. At 1296MHz there is far less amateur activity, but the band is just as crowded with radar transmissions in some districts; it is also just as expensive to get started. But on 10GHz none of this applies, and you can get started for well under £100. The usual roof-top clutter of chimneys and trees, which absorb your precious r.f. so effectively at 1296 and 430MHz, are less significant at 10GHz, simply because the signals are reflected rather than absorbed.

Dave G4NJU, who is a keen exponent of this band, explains how cheap it really is. A typical transmitter would use a Plessey burglar alarm head (cost £5 or £10), which you would equip with a compact 20dB gain horn antenna which you can make yourself easily from printed circuit board. For reception you would use a 10dB gain horn and a modified Astra satellite LNB and receiver. These will cost you between £50 and £70 as rally bargains. Even allowing for extra components, power supply and a smart instrument case, you should still have change out of £100, which is not something you can say for most amateur radio modes.

Obviously you will need some skill to do this, but all the information is available (or soon will be) in magazines like *CQ-TV* and *VHF Communications*. As interest increases, no doubt dedicated conversion kits will come onto the market. Note that generally a lower gain antenna is used for receiving: this is because higher gain means narrower beamwidth, which is not ideal as a search antenna. On the other hand, if you are always going to be receiving a fixed transmitter (such as a repeater), a high gain antenna might be all right. Normal satellite TV receivers are fine, but they generally need to have their video gain increased, according to Dave.

Of course, there is no objection to a more completely home-brew system, but this is not really the province of the newcomer. I'll describe some ideas for a more state-of-the-art system next time, but be reassured that it will be entirely coaxial and solid state: the old days of klystron tubes and waveguide 'plumbing' are over!

If there are any topics you would like covered in this column, please write in and tell me. Feedback is definitely encouraged!

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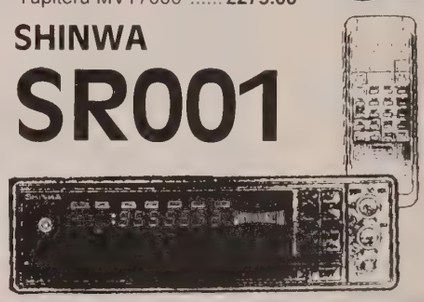

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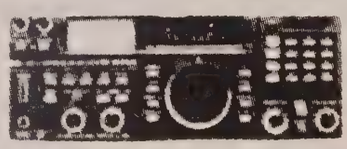

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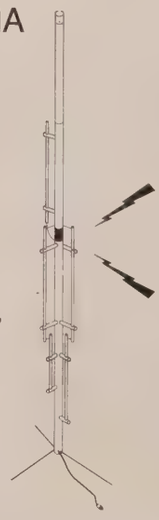

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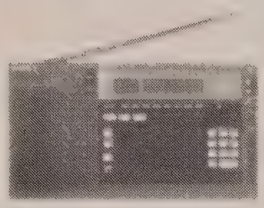

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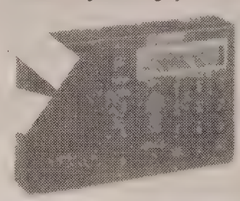

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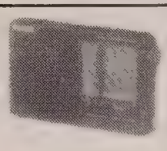

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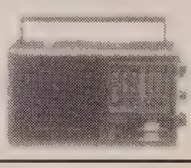

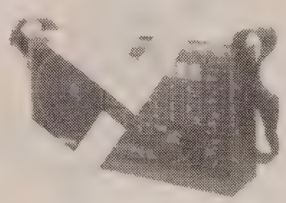

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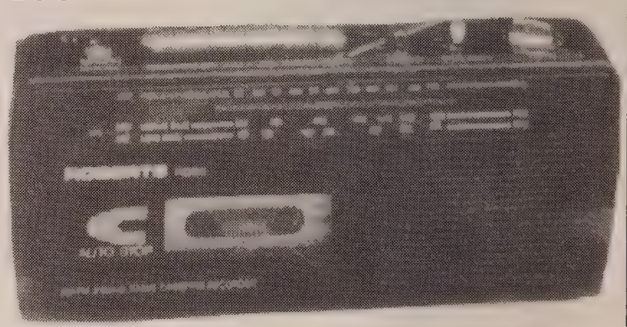

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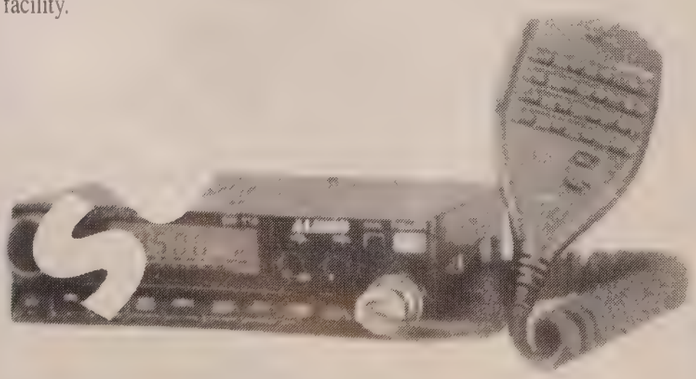

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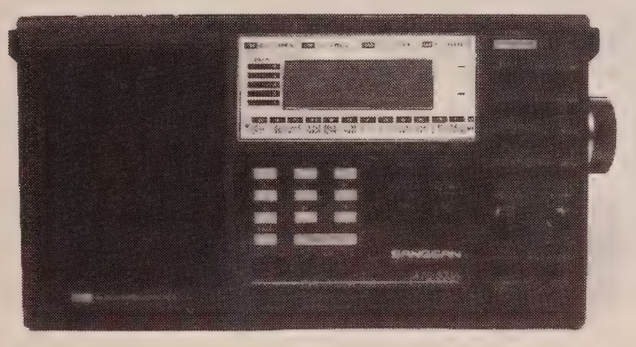

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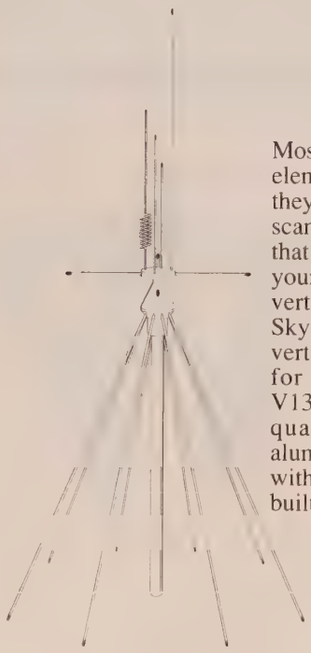

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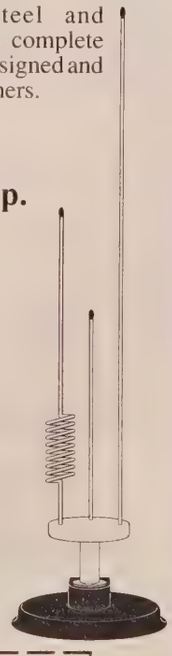

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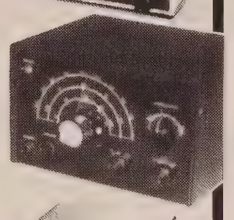

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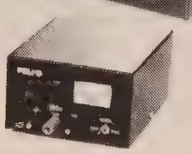

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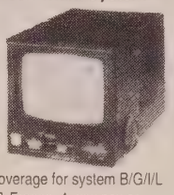

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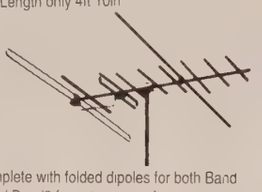

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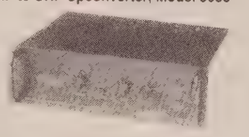

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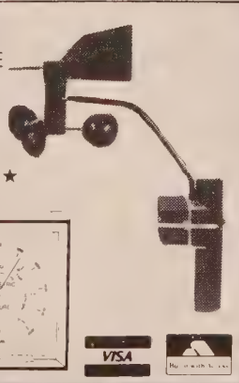

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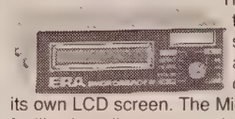

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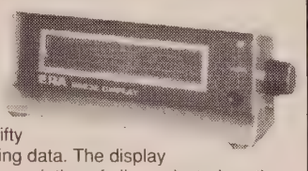

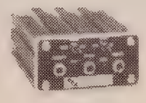

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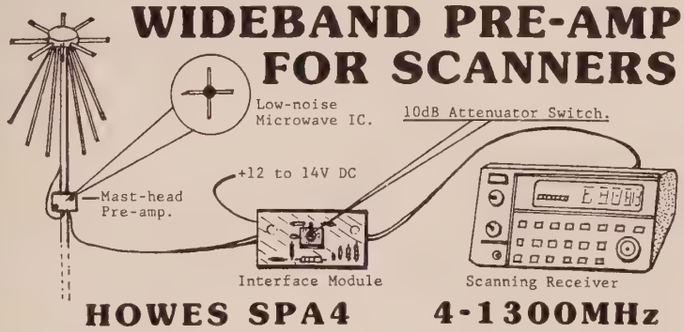

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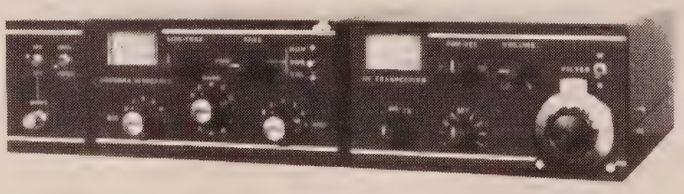

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ABBREVIATIONS

RAD	Radio
MTV	Mono TV
Turn	Turntable
Svc	Service
Man	Manual
Port	Portable
CTV	colour TV
T/T	Teletext
Dir/drv	Direct Drive
Sys	System
CTR	Cassette Tape Recorder

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FOR SALE Realistic PRO 2005 scanner boxed as new with Tandy discone antenna (new) and mag mount, £175. Tel: 081-992 8143 Ealing.

FOR SALE Yaesu FRG-8800 general coverage receiver 0.15-29.999MHz plus 144MHz module 118-174MHz, £500 o.n.o. Tel: 061-491 3755 after 6pm.

FOR SALE Bearcat UBC200XLT v.g.c. complete with charger and case, £120 o.n.o. Also Mapsat v.h.f. weather sat RX, cased, v.g.c., £40 o.n.o. John G6YRB. Tel: (0695) 33499 evenings and weekends.

FOR SALE Amstrad 2086 colour monitor 30Mb HD lots of software, excellent condition, £200. Spectrum 48K circuit board, Rotronics Wafadrive plus 16 wafers, Kempston printer interface, £40 the lot. Tel: 0222 551392.

EXCHANGE or FOR SALE FRG-7 h.f. receiver 0-30MHz with 144MHz v.h.f. converter, £150. Exchange for a ERA Microreader MkII. John. Tel: 021-477 8163 anytime.

FOR SALE Yaesu v.h.f./u.h.f. communications receiver FRG-9600 hardly used, perfect condition, £400 o.n.o. Steve. Tel: 091-265 7086 Tyneside after 6pm evenings.

FOR SALE Panasonic BF3100L communications receiver, 32 bands inc f.m., l.w., m.w., b.f.o., digital read-out, mains/battery, good condition, £90. Tel: 051-625 7654 Wirral.

FOR SALE Sony PRO-80 scanner with airband and 8-way tuning 150kHz-108MHz and 115-223MHz with AC-D4M power adaptor, case, earphone, boxed with manual, mint condition, £200. WANTED Signal R-5375 Heathrow crystals. Chris. Tel: (0753) 840534 Windsor.

FOR SALE FRG-8800, £500. ERA Microreader tutor, £80. Realistic v.h.f./u.h.f. 5in b/w TV, £50. Labgear u.h.f. to v.h.f. converter, £20. If all together, £600. Reg Vickers. Tel: (0532) 661348 Leeds.

WANTED Hallicrafters SX-28 receiver (550kHz-42MHz) in good condition, with manual if possible. P Jarrett. Tel: (0628) 485671 Bucks.

FOR SALE Global a.t.u. AT1000, £40. Maplin active a.t.u., £50 150-30MHz cased. Cirkit automatic NiCad cycler battery charger, 8 cell pack and 4 cell, £35. Buyer collects. Tel: (0379) 652880.

EXCHANGE HS WX2 two months old and Diawa 9.2A power supply unused for PRO2002 scanner. Also want J-Beam 4-el quad in good condition or w.h.y. Tel: (0670) 855953 anytime.

FOR SALE RA17L over-hauled, excellent condition, new valves, spare set, £230. Marconi TF2950/5 mobile radio test set, £350. Pye PF85 u.h.f., £50. All with manuals o.n.o. BJ200 MkIII scanner wall charger £100. Dave. Tel: 081-858 1448 London SE3.

FOR SALE JIM pre-amp 100m boxed, £50. Tel: 031-337 7384.

FOR SALE Yaesu FRG-7700 receiver, FRT-7700 antenna tuner, FRV-7700 v.h.f. converter, Yaesu headphones, MM2000 RTTY to TV converter all very good condition and in use. Best offer o.n.o., £300 the lot. Tel: (0673) 843746.

FOR SALE FRG-8800 with v.h.f. converter and FRT-7700 antenna tuner, £450. Comax CD67-decoder with built-in display. Tel: (0271) 812622 North Devon.

FOR SALE collector's item Eddystone S640 receiver 1.7-31MHz requires replacement of one tuning drive cord otherwise full working condition, few spare valves, £90 inclusive of carriage o.n.o. Peter Dawson. Flat 4, 1 Swan Lane, Stroud, Glos GL5 2HF.

FOR SALE Yaesu FRG-8800 mint, boxed, with FRT-7700 tuner, FRV-7700 converter, £430. May accept latest model scanner in part exchange. Buyer collects or arranges 'RV' reasonable distance from Bristol. Tel: (0272) 861589.

FOR SALE Kenwood R2000 receiver purchased new in March and used only minimally, 1991 *WRTH* and *PWBR* handbooks, £495. No offers. Tel: (0202) 892986 Bournemouth.

FOR SALE Sony ICF-2001D receiver, £165. Tel: (0767) 314381 Bedfordshire.

FOR SALE Sony ICF-7600D receiver, £75. WANTED FRV-8800 or FRV-7700 or FRT-7700 a.t.u. Will exchange with cash adjustment. Tel: (0244) 831138 Deeside, Wales.

FOR SALE AOR 1000 hand-held scanner as new in box complete with NiCads, mains and car charger, antenna, instruction book, etc., £180. Tel: Warrington 574445.

FOR SALE AOR 2002 excellent condition, £260. Tel: (0252) 811774 Fleet.

FOR SALE Philips D2935 World Band receiver, 0.15-30MHz, a.m. including s.s.b. also f.m. waveband, digital tuning, boxed, immaculate condition, £85. Tel: (0494) 450432 High Wycombe.

FOR SALE Yaesu FT-726R 144MHz, 430MHz with 10-element antennas both bands, condensor microphone, Yaesu YS-500 wattmeter standing wave bridge, ready to go satellite communication system in first class new condition, £450. Tel: (0253) 725499 or (0253) 712769.

FOR SALE Realistic PRO-2022 200 channel scanner, hardly used, 8 months old, boxed with manual, £160 o.n.o. Also Advanced Morse trainer MMS2 with instructions plus Morse key, £75 o.n.o. Tel: 021-354 2815 Sutton Coldfield, Birmingham.

FOR SALE Vintage equipment. W/S 19 MkIII (Russian Legends), R1155, R1475, R209, R216, HRO, Redifon GR-361 TX/RX, £50 each o.n.o. T19.ARC5 command transmitter, £20, BC221, £15, VCR97 tube, £5, No. 10 calibrator, £10. Tel: (0704) 64398 Southport.

FOR SALE Yaesu FT-101 transceiver Tranz Match s.w.r. bridge, spare valves, mic, manuals, very good condition, only £150. Buyer collects. Tel: (0204) 43589 Evenings Bolton.

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FOR SALE Trio R2000 receiver with VC10 v.h.f. adaptor, very good condition plus box and manual, £360. Tel: (0538) 702215.

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FOR SALE Sony ICF-2001 hardly used, £190. Realistic PRO2004 scanner, modified for 400 channels and fast scan, £180. JVC 610 5in portable TV PAL/SECAM 5.5, 6 + 6.5MHz sound, £150. Tel: (0543) 252121 south-east Staffs.

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FOR SALE ERA Microreader MkII little used, still under makers' guarantee, £100. Tel: (0924) 260682 anytime West Yorkshire.

FOR SALE Trio R2000 receiver with VC10 v.h.f. adaptor, £450 o.n.o. TS120V SP120 VFO120 PS20, £400 o.n.o. All equipment unmarked as new, buyers collect. Stuart G4OOK QTHR. Tel: (0642) 211685.

FOR SALE Icom IC-R71E 0-30MHz communications receiver boxed as new, immaculate condition, £530 o.n.o. Datong model PC-1 general coverage converter v.h.f. to s.w. good condition, £75. Chris. Tel: (0992) 583007 Hertford.

FOR SALE Icom IC-R72 communications receiver 100kHz-30MHz s.s.b., a.m., c.w. modes, 3 months old, external Icom speaker, £500 o.n.o. Eric Orchin. Tel: (09603) 82607 evenings.

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FOR SALE AOR3000 multi-band scanning receiver, a.m./s.s.b., n.b.f.m./w.b.f.m./100kHz-2036MHz, 400 memories, £595. Standard AX700 scanner, Panoramic adaptor, 50-905MHz, 100 memories, £395. AOR1000 hand-held scanner, £165 all boxed with usual accessories. Will consider part exchange for ICR-71E/R5000/NRD-525. Peter. Tel: (0798) 872363 West Sussex.

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FOR SALE AOR 1000 plus D130N discone, £200. Eddystone EC10 Mk2, £50. Tandy 100T, 40 channel, CB hand-held plus accessories, £50. All equipment as new, boxed. Buyer collects or carriage extra. Tel: (0246) 415667 after 5pm.

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WANTED AR3000 (or 2500) cash waiting. Also JIM M75 or 100 preamp. FOR SALE Realistic PRO-2006 25-1300MHz 'Hypascan' 400 channel. memories, priority, a.m., f.m., f.m. wide, boxed, mint, £245 (cost £350). Tel: (0279) 429543 Essex.

FOR SALE Valradio d.c./a.c. converter (200/250V d.c. input, 110/115/2209/250V a.c. output), Truvox 2-station radio jack (1950s?). 1942 bound volume *Wireless World*, 1970 *Guide to Broadcasting Stations*. Any reasonable offers considered. Tel: (0483) 272331 evenings.

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FOR SALE Newbrain computer Z80A processor. Also technical manual, suit enthusiast, buyer collects from Clwyd, £30. Tel: 061-707 3905.

FOR SALE ERA MkII Microreader, £100. Also ERA BP34 filter, £80, both new. Datong Active Antenna D370, £25. Kenwood HS-5 'phones, new, £25.00. Also G4ZPY key, £15. Stone. Tel: (0843) 228321. Consider offers.

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FOR SALE National Panasonic RF-8000 24-band f.m., a.m., l.w., marine bands, highly sensitive receiver, £500 including postage. Tel: (0695) 28945.

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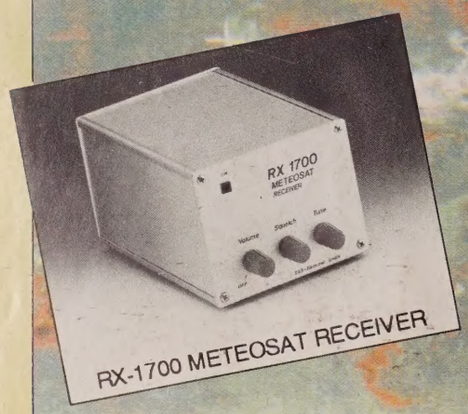

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